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BBC ACORN USER

UNIX AND RISC OS:
First details of Acorn's new systems

PERFECTION IN PRINT:
Liquid crystal and inkjet technologies

DIRECT APPROACHES:
The shortest route point to point

THE BIG LINK UP

Making connections with your BBC micro



THE · LAST

NINJA


LEVEL 1


LEVEL 2


LEVEL 5


LEVEL 6

THE LAST NINJA ... THE STATE OF THE MARTIAL ARTS

The secrets of the Ninjitsu way had been jealously guarded for centuries, only once every decade were the scrolls seen at the ritual of the White Ninja.

None coveted these secrets more than the evil Shogun. Siezing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one ... You. The Last Ninja.

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To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands, magnificent gardens then descend into the direst dungeons before the final confrontation ... You cannot fail. You are the Last Ninja.

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(The screen pictures show the BBC Micro version of the game.)

THE LAST NINJA, one of the greatest No. 1 hits on the Commodore computer, is now available for the BBC Micro/Master and Acorn Electron computers, under licence from System 3/Activision (UK) Ltd.



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Transfolink, packaged in a black briefcase, comprises all the leads and software you need for transferring files between the IBM PC/AT & compatibles, the BBC MICRO, and the ATARI ST.
Transfolink will shortly be available for APPLE MACINTOSH, COMMODORE AMIGA and CAMBRIDGE Z88 COMPUTERS.
Please phone for details of availability.
The philosophy is simple. Run the program; the screen interface looks the same on every machine (so it's easy to learn). Connect the machines together using the leads provided. Select a file and send it! No further knowledge or experience is required.
Transfolink is designed to provide all the file transfer components; software and leads in one easy to use package. Transfolink, as its name suggests simply links two computers together and transfers your files. Now you can cross the manufacturer barrier with ease. Instructions are presented in a filofax compatible manual.
Transfer files from a laptop to a desktop machine, from a personal computer to a business computer, between any combination of hard discs, floppy discs and RAM drives, or even from hard disc to hard disc (backing-up made easy!).

- Will simply and easily link any two supported microcomputers
- Does not require any boards or modification to the microcomputers
- Single screen operation with minimum of user intervention
- Prompting for rename/overwrite of existing files
- Prompting for rename of read-only files
- Prompting for change of disc if no free space for file
- Histogram indication of data transfer process
- High speed multiple file data transfer
- Robust communications protocol utilising CRC algorithms
- Utilises industry standard RS-232C or compatible serial interface
- Fully automatic retries on detected data errors
- Automatic connection and link verification on startup
- Universal polarised connecting coupler
- Comprehensive filofax compatible user manual
- On-line pop-up information windows and help



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With PipeDream, you compose your work in the order you want to print it, with text and numbers all together in one document. Incorporate calculations directly into paragraphs of text and formatted paragraphs directly into spreadsheets.

With this new approach you get a whole new dimension of power . . .

PipeDream is a word processor offering many columns of formatted text. That film script you were going to write next holiday? Ideal.

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"PipeDream itself is a remarkable achievement. It offers a spreadsheet, a word processor and a database, and if you think I am talking about a conventional integrated program, you are wrong. PipeDream does all those things within one program. No switching between modules or cutting and pasting; PipeDream simply offers you a matrix of 'slots' into which you can either type continuous text or figures or formulae or database 'fields'."

That was PipeDream on the Z88.

Now we've completely rewritten it for Archimedes. The result is even friendlier, faster and more powerful. There are full menus and dialogue boxes, making the most complex operations easy to carry out. You'll probably never even need to look at the comprehensive PipeDream tutorial and reference book. And keyboard wizards will love the optimised keystroke alternatives to the menus. Some will even devise their own key layouts, using PipeDream's unique keyboard programmability.

We've maintained 100% file and keystroke compatibility with Z88 PipeDream, so you can transfer files between the Z88 and your Archimedes.

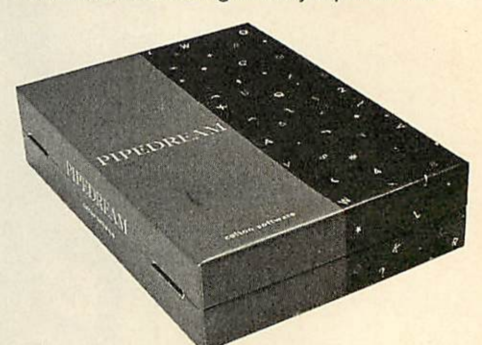
PipeDream is also 100% file compatible with PipeDream on the IBM PC, and Acornsoft's VIEW PROFESSIONAL for the BBC Microcomputer, so you could work at home on your BBC Microcomputer and take your files to the office on your Z88, to use on your Archimedes or IBM PC. No other software enables you to share your files with all these computers.

New facilities include:

- user-definable colour displays
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- linking files enabling you to pass the results of calculations between spreadsheets.

This in addition to all the facilities many thousands of Z88 PipeDream users have come to expect:

- fully wysiwyg display (what you see is what you get)
- many columns of formatted text on screen
- full spreadsheet power includes dates
- live calculations within formatted text
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- documents consisting of many separate files.



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BBC ACORN USER

ISSUE NO 79 FEBRUARY 1989

COVER



COVER FEATURE

Transfer your work between micros, pages 79-85

Cover by Tony Buckley

EDITORIAL

At last Acorn releases its Unix system and RISC OS, arranges support and backup for Unix, and gives strong advice to software writers for RISC OS. An auspicious start to the company's second decade.

RISC OS gives software writers the stable platform they have been waiting for. It makes the machine a viable alternative to the PC or Mac for doing real work. It is a massive boost for the machine. And it takes the machine strongly upmarket – a 305 is not happy with RISC OS, and 1Mb machines begin to look cramped with a decent RAMFS, font cache, and two 250k application programs.

It's too easy to say it should have been there at the beginning. True, it makes the Arc what it should have been, but in December 1988 *Acorn User*, we described the rush to get out Arthur 1.2 in just nine months. RISC OS is quite an achievement for the 12 months since.

NEWS

FEATURES



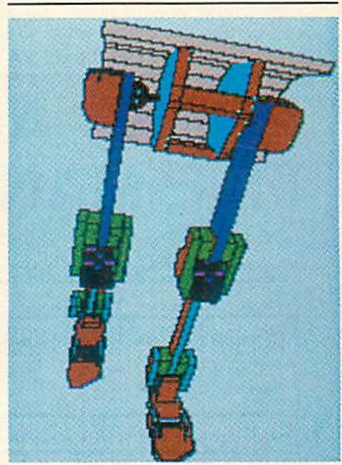
REVIEWS



EDUCATION

REGULARS

NEXT MONTH



A new series on sideways RAM, a look at business software, using *Designer Castles* in education, and an in-depth review of Euclid, an Archimedes solid modeller



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"It's very easy to create an entire customised front end for your own use." – *Acorn User, August 1987.*

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Electron & Plus 3 users . . . gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. We can also supply 5.25" disc drives to add to your Plus 3 (inc 2nd drive adapter). "ACP has produced another superb ROM for the Electron". . . Electron User Feb '86 (Supplied on 16K EPROM + DFS MANUAL)

Also DFS E00. An alternative to the DFS, designed for use in Sideways RAM (ABR). **(14)/E + ABR** (3.5" ADFS disc + manual) ***£19.99***

ADVANCED ROM ADAPTER 2/M/E — £13.00 excl VAT: £14.95 inc VAT

An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8k or 16k EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use - No switching - complies fully to the Acorn (sideways) ROM filing system. "The best ROM cartridge is by far the ARA 2. . . *A&B Dec 86*

ADVANCED BATTERY-BACKED RAM M/E

A standard Acorn approved cartridge but containing 32k (2 x 16k) of sideways RAM. The added bonus is the battery-backed feature that holds the RAM contents when the power is switched off! Different ROM images can be loaded into either bank from ROM images previously saved. The banks can also be locked to imitate ROM use. Now it is possible to have View & ViewSheet in one cartridge every time you switch on. Other uses include &EOO ADFS, printer buffer, ROM software development. The use of ABR is simplified by the newly written PRES software utilities which include:- SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put your own software from disc or tape into ABR and use the ROM filing system. All software is supplied in ABR with a simple menu to transfer the utilities to your own media. No hardware switching - totally software controlled. Instructions for using supplied software and necessary information for users developing their own applications.
"It's a superb add-on and a must for all serious Electron Users". . . *Electron User*

£39.00 excl VAT; £44.85 incl VAT

Special limited offer for Master Users AMX Mouse package with Supercart software and Mk III Mouse. Previously over £60 —
PRES price £29 ex VAT, £33.35 inc.

ADVANCED PLUS 7/M/E/B/C — £39.50 ex VAT; £45.42 inc VAT

An internal battery-backed RAM upgrade for the Advanced Plus 6. TWO 16K pages of Sideways RAM, battery-backed and featuring full write protect facility. Just like ABR but fitted internally & vacating a cartridge slot. This product is compatible with all Acorn BBC/Master & Electron computers.

ADVANCED DISC INVESTIGATOR (06)/M/B/E/C — £28.75

A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40 track discs to 80 track discs, verify two non-standard discs.
("ADI features an extremely comprehensive sector editor, and one of the finest I've seen". . .Tubelink on Prestel) (supplied on 16K EPROM + manual)

ADVANCED 1770 DFS — £34.50

3 versions ADM/C(11) - ADB(12) ADE (13)

ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is a very fast and powerful disc filing system with the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC. (16K EPROM + comprehensive manual)

PRINTER . . . Panasonic KX-P 1081 Graphic Epson Compatible NLQ ready to connect including capable, delivery and VAT £155.65 ex VAT £179.00 inc VAT (Spare Ribbon £5.50 ex VAT; £6.32 inc VAT)

DISC DRIVES	Ex VAT	+ VAT
Cumana 5.25 dbl/sided 40/80 track, switchable, inc psu	£129.56	£149.00
Cumana 5.25 single/sided 40 track, inc psu	£112.17	£129.00
Cumana 3.5 dbl/sided 80 track, inc psu	£112.17	£129.00
PRES special 3.5 single/sided 80 track, inc psu	only £59.00	£67.85

PRES – ADVANCED FILE MANAGER M/B/E/C

The ultimate 'front-end' for ADFS and DFS £25.00 ex VAT; £28.75 inc VAT

```
Advanced File Manager 1.04 (C) PRES 1988.

Source: Advanced Disc FS.:0.$.Software.AFM.afm104

          AFMexp     App        APPS       ASM        changed    changes
LETTER102 Letter103  letter104  manual1a   manual1b   manual2    manualch
PAL       PALB       PALM       PRSRAM     q
sd        SDC        SDINFO     SPEEDY     ZF         ZG         ZH
ZPprint   ZPZG       ZPZH

Target: Advanced Disc FS.:1.$.AFMarchive

AFM       ASM        s1         s2         s3         s4         s5
s6        s7         s8         s9

(C)hange : Off  (F)ollow : Off  (O)ver : On   658951 bytes free  10 marked
s6 noted for copying to Advanced Disc FS.:1.$.AFMarchive
s7 noted for copying to Advanced Disc FS.:1.$.AFMarchive
s8 noted for copying to Advanced Disc FS.:1.$.AFMarchive
s9 noted for copying to Advanced Disc FS.:1.$.AFMarchive
```

Screen picture shows AFM in Copy mode on Master Turbo

AFM follows the PRES 'Master Plan' of upwards compatibility – it runs on Electron, BBC B, B+, B+128, Master 128 and Compact, with Second/Co-processors and Acorn-compatibile versions of DFS & ADFS.

AFM has four distinct modes:

MENU – allows browsing through the files and directories on a disc. Files are started from a menu of up to 7 options chosen for a selected ROM. Loaders are provided for Basic, The Basic Editor, View, ViewSheet, ViewStore, ViewSpell, Edit, Wordwise (+) and InterWord. This list can be expanded infinitely using an Acorn-approved OSWORD call. . . full details and example in the manual..

DELETE – allows files to be marked and then deleted with one keystroke.

RENAME – allows one or more files to be marked and then renamed using a wildcarded name, ie one which varies with each file renamed. Thus you could rename s1, s2 and s3 to be s1_old, s2_old, and s3_old in one operation. . . and that's only the beginning! As well as using the whole of the original name you can also pick out individual characters to form part of the new name.

COPY – the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!

Large files can be split across several disks, and recombined.

As much as possible of the computer's memory is used for copying files, including unused parts of shadow screen memory, sideways ram banks (inc. AP7), ram cartridges (inc. ABR (32K) and AQR (256K)), tube memory (up to 61K), B+ paged ram (12K) and unused parts of the Slogger Master Ramboard (Electron).

Comprehensive error trapping and recovery is provided, so a copying run will rarely have to be aborted unfinished! And there's much, much more.

THE ADVANCED PLUS 3

Now you can turn your Electron & +1 into a full disc system - no more waiting for tape loading or 'bad block' 'data?' messages. A.P. 3. gives you. . .

1. A fully Acorn compatible 1770 interface
2. 80 track 3.5 disc drive, as used by Acorn (320K capacity)
3. Separate PSU
4. Acorn ADFS
5. Welcome disc
6. Utilities
7. Full documentation
8. All the advantages of the original Plus 3 PLUS extra ROM socket.

UNBEATABLE PRICES

OUR TOP SELLING PRODUCT

All this without dramatically increasing the required desk space!
Now well into the SECOND THOUSAND production.
Remember - 2nd drives (3.5 or 5.25) can be added and the AP3 drive can be used on a BBC or Master computer! Also most Electron disc-based software is supplied on 3.5 ADFS discs.
The only fully compatible disc upgrade running Acorn's own preferred filing system (supplied on: Plus 3, Master 128, Master Compact and now the Archimedes)

EXTRA BONUS
3 games on disc - SNAPPER - DRAUGHTS - REVERS!

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ADVANCED PLUS 1. . . The plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer, printer port, joystick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheet, Pascal, Logo and our own popular AP4 disc upgrade.
£50.00 excl VAT; £57.50 inc VAT

ADVANCED PLUS 6. . .a fully buffered 6 ROM expansion module for the Electron user. AP6 is fitted inside the advanced Plus 1 or modified Acorn Plus 1 (when used with the Acorn Plus 3, 5 ROM sockets are available). All sockets are designed to accept either ROM/EPROMS or RAM chips. A further feature is the optional AP7 upgrade.
"A marvellous piece of design. . .don't hesitate buy it!" - *EU, May '88*
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Upgrade service available for original Acorn Plus 1 please call for details

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£99 excl VAT; £113.85 inc VAT
Please state 3.5" ADFS/5.25" DFS

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A unique interface for those wanting the maximum expansion from just one slot in the PLUS 1 AP5 contains:- A User port for connecting peripherals such as a mouse. 1 MHz bus allowing Music 5000(e), prommers and various control devices to be added. Tube interface for connecting and Acorn 2nd processor or even a Master Turbo board (through a 'Co-Pto Adaptor') - & TWO spare ROM sockets (1 high priority). All hardware connections are Acorn compatible thereby allowing many BBC products to be added (remember that some software modification may be necessary for the Electron). So although some expansion options may appear expensive on an Electron you do have upward compatibility.
£55.00 Ex VAT; £66.70 inc VAT

Advanced Plus 2 ROM

We feel this is one of the best, low cost, additions we have produced for the Electron & +1 user, especially for Plus 3, AP3, ABR & AP7 users now with this easy to fit upgrade you can add:

1) Fix for Tape filling system in Hi-res screen modes. 2) * ROMS- displays ROM/ROM images present. 3) * UNPLUG disable ROM/RAM image. 4) * INSERT - enables or inserts a previously unplugged ROM. 5) * KILL - totally disables the Plus 1. 6) * LOCK - locks a sideways RAM bank in ABR, AQR, AP7 7) * LROMS - locks all sideways RAM banks found. 8) * UNLOCK - to unlock a sideways RAM bank in ABR, AQR, AP7 9) * UROMS - to unlock all sideways RAM banks found. 10) * SAVEROM - saves a ROM image to current filing system. 11) * LOADROM - loads a ROM image from current FS into a RAM bank. 12) * FORMAT - will format an ADFS disc for Plus 3 or AP3. 13) * VERIFY - tests every sector on an ADFS disc. 14) * VFORM - formats and verifies an ADFS disc in one command. 15) * BUILD - creates a text file that can be used by *EXEC (ie !BOOT). 16) * LIST - displays a numbered listing of a text file 17) * TYPE - displays a file on screen with no line numbers. 18) * DUMP - to view a file's contents on screen. 19) * LANG - selects a default language to be booted on {CTRL-BREAK} 20) * HELP - provides a full 'help' list on all the ROM's commands. 21) * AQRPAGE - selects specified page in AQR.

Now there is no need to search for your utilities disc every time you want to Format/Verify a disc, Build a !BOOT file or lock/unlock/Load a ROM image into ABR PLUS much more . . . . . the ideal companion from the company that produces the Acorn Plus 1.

£11.00 ex VAT; £12.65 inc VAT

The AP2 is the definitive Plus1 ROM. . . . .I'm not sure what i'd do without it. . . . .like all of PRES's other products, it's been well worth waiting for"
July '88

FILING SYSTEMS

ADFS VERSION 1.1
Suitable for existing Plus 3 or A.P.4 users. This new version has the software fixes for Zysyshelp, write protect disable & compaction. Also Winchester code has been replaced with the necessary driving software to handle AQR as a 256k RAM DISC. Please note - ADFS is Acorns adopted standard filing system supplied on the Plus 3, Master 128, Master Compact & now the Archimedes. Supplied on 16k ROM with Welcome disc & utilities. Please state 3.5/5.25 welcome disk.
£14.95 ex VAT; £17.19 inc VAT
(ADFS manual supplied separately)

ADFS EOO
For Electron users with either Plus 3 or A.P.4 and 32k of S/W RAM i.e. ABR. All the benefits of ADFS but without all the loss of RAM! Includes all the software 'fixes' call for managing the new & original ADFS. One of the most frequent question we are asked: "How do I get back the memory lost on my Plus 3 system?" Answer: PRES ADFS & EOO regains 3.75k leaving page @ &EOO the same as Tape!
ADFS EOO supplied; 3.5 ADFS (manual available separately)
£14.95 ex VAT; £17.95 inc VAT
5.25 ADFS (manual avail. sep.) **£14.00 ex VAT; £16.10 inc VAT**
5.25 DFS(2 discs+ADFS manual) **£19.00 ex VAT; £21.85 inc VAT**
(See Special Package Prices)

DISC INTERFACES (Plus One required)

AP3 INTERFACE: As supplied with AP3 package. A fully Acorn compatible disc interface that will accept any standard 5.25 or 3.5 80T drive with PSU. It runs Acorn's ADFS (as supplied on Acorn Plus Three, Master 128, Master Compact and now the Archimedes) supplied with A.D.F.S. manual and welcome disc + Utilities and 3 bonus games (please specify 3.5 or 5.25 80T format). Also provides a spare 16K rom socket. **Price £52.00 ex VAT £69.95 inc VAT**

AP4 INTERFACE: A fully Acorn compatible disc interface that will accept any standard 5.25 or 3.5 drive with PSU. It runs the 1770 DFS (as fitted in the BBC 'B' and Master) keeps pace at &EOO - has utilities in rom and provides a spare 16K rom socket (DFS manual included. **Price £61.36 ex VAT £69.95 inc VAT**

AP34 INTERFACE: Get the best of both filing systems. Now available from PRES the ultimate interface. Fitted with both Acorn approved filing systems. . .Acorn's current standard ADFS and Acorn 1770 DFS (which can be run at &EOO) ADFS and DFS manuals supplied + ADGFS welcome disc with utilities.
Price £69.55 ex VAT £79.98 inc VAT

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ADVENTURE GAMES 5 different adventure discs:- Ultimate Prize, Dreamtime, Priate's Peril, Taroda Scheme & Stranded.
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3 ½ ADFS £9.99 ex VAT £11.49 inc VAT
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View the Acornsoft word process for the Electron & +1 inc. full documentation £14.94 inc VAT
ViewSheet The Acornsoft. . . . . spreadsheet for the Electron & +1 inc. full documentation £14.95 inc VAT
View & ViewSheet special price. . . . £22.00 inc VAT

SPECIAL PACKAGE PRICES

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AP1 + AP6	£77.00 ex VAT	£88.55 inc VAT
ABR + 3.5" ADFS E00	£48.65 ex VAT	£55.95 inc VAT
ABR + 5.25" ADFS E00	£46.95 ex VAT	£53.99 inc VAT
ABR + 5.25" DFS (ADFS E00)	£51.00 ex VAT	£58.65 inc VAT
AP5 + Music 5000	£152.17 ex VAT	£175.00 inc VAT
AP7 + 3.5" ADFS E00	£49.52 ex VAT	£56.95 inc VAT
AP7 + 5.25" ADFS E00	£48.65 ex VAT	£55.95 inc VAT
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NEWS

Seasonal bleepings

BBC micros turn up in the most unlikely places, but none more so than at a Christmas Carol concert.

When the Swing Bridge Singers from Newcastle upon Tyne were invited to sing in the cathedral at Christmas, they decided to take their BBC micro along – and the concert was billed around town as Christmas Choirs and Computer in the Cathedral.

Many of the singers are pupils at Redewood School in Newcastle, and use the Hybrid Music System, based on the BBC micro, in their music lessons. Their teacher, Dave Blackwell, used the system to help him write a set of gospel songs, *Soul Fire,* which were performed as part of the concert. The computer came with them to accompany the more usual guitars, drums and keyboards.

Arc fax due soon

Computer Concepts has announced prices for its Archimedes fax card. The Fax Pack won't be available until its BABT approval is officially registered, which will give you time to save up.

The expansion card and software costs £573.85 and can send faxes which have been converted from word-processor and graphics files.

If you want to fax messages written on ordinary pieces of paper you will need a document scanner as well, and this pushes the price up to £918.85, expensive, but still below the price of a dedicated fax machine.

Acorn to unveil Unix machine

Acorn is unveiling its Unix machine, the R140, at the BETT '89 show in London on January 18. A few days later it will be launched officially at the *Which Computer?* Show at Birmingham's NEC.

'We expect it to appeal to the tertiary sector as well as some parts of the secondary sector,' said Michael Page, Acorn's corporate communications manager. The R140 will be running the *SAMS* school administration package as well as standard Uniplex productivity software and IXI's *X-Desktop*. But this is only a preview: the real launch will be made among the businessmen and corporate buyers who attend the Birmingham show. 'The machine has to appeal to this market,' Page explained.

The numerical name is a departure from Acorn's usual choices, such as Electron or Archimedes. 'It's the kind of name this sort of machine has,' said Page. Workstation manager David Slight confirmed the base model is the beginning of a whole range of machines.

Technically, the R140 is not very different from the Archimedes 400 series on which it is based. Rumours of 8Mb of memory and a faster ARM chip will not be proved true by this release. It does have a 50Mb hard disc, almost full with the Berkeley 4.3 Unix operating system and language compilers, together with Unix series V extensions and X-windows software.



David Slight looks happy with the R140, running IXI'S *X-Desktop*

The floppy disc drive can read ADFS, MS-DOS or Xenix discs. Networking is catered for by Sun's network filing system and an optional expansion card for both standard (thick-wire) and thin-wire Ethernet. Other expansions available 'soon' include an SCSI interface board which will allow larger external hard discs to be added, and the hardware floating point podule to boost performance.

And the price? David Slight confirmed the base machine will be just under £4000, including the bundled support package. In his opinion, 'It's a tremendously good buy for lots of people. On raw performance, it compares quite favourably with the Sun 386i and Apple Mac 2 running AUX.' Multisync and high-resolution mono monitors add to the system cost, but overall it's about half the price of comparable machines.

Shareout

Inspired by the wide range of public-domain programs on offer for his Apple Macintosh, Paul Beverley of Norwich Computer Services has put together three shareware discs for the Archimedes. The discs, the most expensive of which costs £4.50, include a wide range of utilities and games.

'Shareware is only just starting for the Archimedes, because there isn't the wide user base the PC and Mac have,' he says.

He is now preparing a fourth disc and a disc of programs to run under the PC emulator. Dabs Press also offers discs of PC shareware aimed at both Archimedes and Master 512 users.

They cost £35 each but include wordprocessors and spreadsheets as well as the usual utilities.

Three for Arc

Silicon Vision has just released a range of new programs for the Archimedes. *RiscBasic* is a compiler which for £100 will turn your Basic into fast ARM machine code. *RiscForth*, at the same price, implements the Forth-83 language, especially suitable for Archimedes programming because it supports multi-tasking.

Super-Dump takes an Archimedes and a nine-pin Epson dot-matrix printer and produces screen dumps at resolutions of up to 240 dots per inch. It costs £24.95.

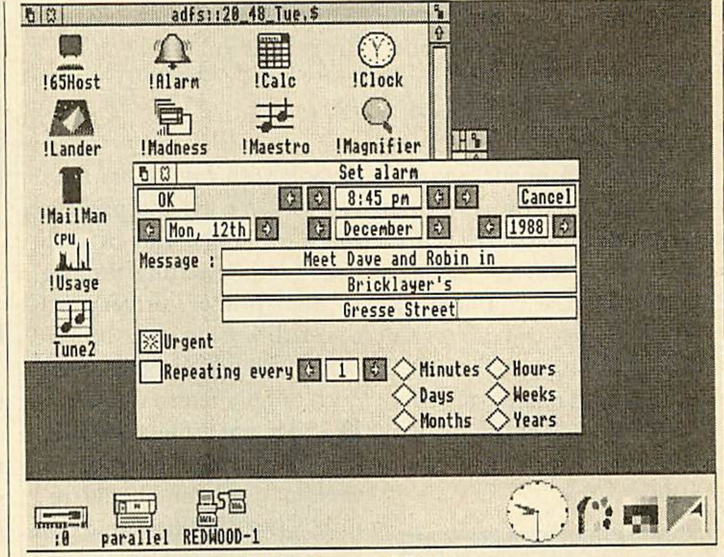
New toolkit

Clares has upgraded its Archimedes utility package, *Toolkit Plus*. New features include a hard disc archiver, and it has been improved with faster searches and new commands. Users of the original can upgrade for £24.95 while the price to new users is £49.95.

RISC OS is ready for April launch

RISC OS, Arthur's successor as the Archimedes operating system, will be ready for release in April. But software developers, helped by *Acorn*, are already planning welcome cele-brations with a flurry of upgrades and rewrites to ensure that their software makes the best use of RISC OS' many facilities – detailed on pages 22-24.

Users who buy the four ROM chips which contain the operating system will receive three discs as well. Two are Welcome discs, containing bundles of applications, games and utilities. The third is now being put together. Several software developers have been allocated a directory each on the disc, which they will fill with the revised start-up sequences and icon sprites preferred by RISC OS. Text files



RISC OS screen printed with its own driver

of program information will also be included.

Sue Wall, who co-ordinates software developers' work from Acorn, believes that many developers will take up this offer. 'But some programs are ready for RISC OS now,' she says. 'Clare's *Pro-Artisan* for example.' Developers are still queueing up to attend the familiarisation courses which Acorn has been running for several months.

Arc brings London Weekend to life

The Archimedes is starring on screen again with a leading role in London Weekend Television's new regional news magazine, *The Weekend Live*. Presenters include former Radio 1 DJ Mike Smith. The program is being billed as interactive television because viewers will be able to phone the program in response to items and request information.

This is where the Archimedes comes in; information and viewers' addresses are entered into one of the 12 being used and requests are processed with Minerva's *System Delta Plus* software. As the switchboard and computers are part of the set viewers can see it all.

Another Archimedes will use a graphics package to display a map of the south-east divided into 10 areas. Viewers will be able to see whether anyone from their area has phoned the programme.

Programme manager Robin Eddleston said: 'We started thinking about computers for the programme and whenever we thought about graphics the Archimedes seemed the obvious choice.' Acorn itself helped with the installation, and readers in the London area can see for themselves this weekend.

Windows without pain

Programming for the Arc's WIMP environment can be complicated. That's what Simtron thinks, and the company hopes that programmers will buy its *Archway* toolkit to take the pain out of windows.

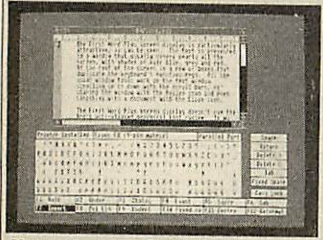
Shell programs enable users to insert their own programs into an existing windowed environment.

The program costs £79.95 including four discs and comprehensive manual. A new RISC OS version will be released in May, for £99.95, but registered users will be entitled to free upgrades. It will support new RISC OS features such as multi-tasking.

CUSTOMER HOTLINE

More support info from Phil Colmer, Acorn's head of customer liaison. (SID, by the way, is not his mate but Acorn's Support Information Database).

■ Calling all Archimedes owners! A competition will be held on SID during January and February which will be open to registered and guest users alike. The prize will be a copy of *Corruption*, the new graphical adventure game from Magnetic Scrolls. There are 10 copies to be given away, courtesy of Rainbird Software, so get dialling. In case you aren't a registered user, you can access SID by dialling (0223) 243642 and using standard viewdata protocols. Full details of the competition are available with *SIDCOMP#



Upgrades for *First Word Plus*

■ This month's application note to be featured in the column is the *Archimedes Application Authors' Guidelines*. It is aimed at the experienced user of the Archimedes who is intending to write software for general release. It covers many of the dos and don'ts of how an application uses the resources of the Archimedes and contains many good guidelines for writing an application which will work both with Arthur 1.2 and RISC OS. Get your copy from the Customer Support Department.

■ For those Archimedes owners with *First Word Plus* and an Epson-compatible printer, here is a tip which will solve many aches and pains when using the wordprocessor with a printer which automatically line feeds. As you know, the manual states that auto-line feeds must be disabled, but this clashes with many other Archimedes packages. So here are the changes you need to make to your printer driver:

Entry 1 set to D
Entry 23 set to 1B, 41, 0, D, 1B, 32

■ Still with *First Word Plus*. If you can't get the package to pause at the end of each page (despite setting the flag in the printer driver), an updated version may be obtained from Customer Support. Simply return the disc.

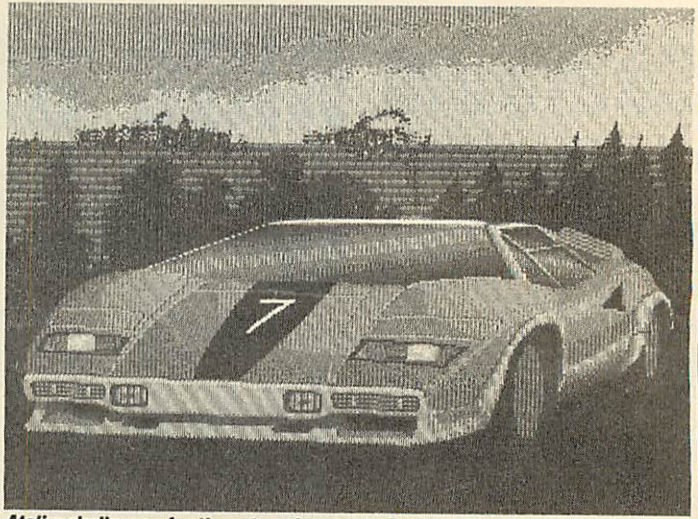
■ If you are using a level III fileserver which is prior to version 1.06, you should return your utilities disc to Customer Support for a free upgrade.

■ You might be interested to know that the Archimedes Language Forum and the SID Education magazine have now started on SID.

The former is edited by David Wild who at one time wrote for TubeLink while the latter is edited by Mark Sealey who writes for the *Times Education Supplement*, *Micronet*, *Archive* and *Risc User*.

■ If you have a copy of the Pascal, Fortran or C compilers for the Archimedes, you might like to know that release 2 is now available and you can upgrade by sending the compiler disc and a cheque for £30 (per compiler) to Acorn Direct, Studland Road, Kingsthorpe, Northampton NN2 6NA.

■ Just a reminder about writing to Customer Support. To ensure the mail reaches us quicker, the proper address is Customer Support, Acorn Computers Limited, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.



***Atelier* challenges for the art package grand prix**

AA in the attic

Minerva Software has added to the hordes of Archimedes art packages with its own release, *Atelier*. The program sells for £79.95. According to Minerva's Nova Fisher it received 'a great response' on the company's recent tour of Australia and New Zealand.

The program's features include 256 colours, windowing, standard lines and shapes, and a zoom pixel editor. Images can be mapped around any three-dimensional shape and stored as animated sequences. A sprite editor allows objects to be moved around the screen independently of the background.

Although there are already several Archimedes art packages available Fisher is confident that there is room in the market for *Atelier*.

Minerva is also updating its *System Delta Plus* database. The new version, provisionally titled *System Delta Plus Two*, is described by Fisher as a 'professional' version. New features include the ability to search phonetically.

In April *Multi Data* will add RISC OS multi-tasking features to the program.

Danes branch out

Acorn users in Denmark have formed their own user group, Quercus (Latin for oak). The group imports Archimedes for its 60 members, and they communicate through a bi-monthly newsletter, called *Egebladet*.

The group's publicity officer Bo Mohr Andersen hasn't told us what that means. But he has kindly included one of the cartoon strips featured in the magazine.



Quirky humour from Denmark's *Egebladet*

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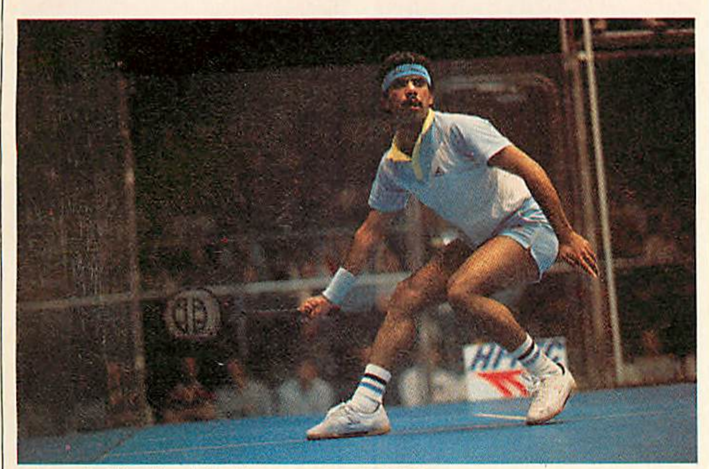

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BBC micro beats squash racket



Jahangir Khan's style shows up on screen

British sports players have a weapon to keep them winning. Using techniques developed at Liverpool Polytechnic, styles of play can be analysed by computer, helping to develop strengths and focus on opponents' weaknesses. The England Junior Squash Squad, Blackburn Rovers and various rugby teams have already used the system.

Dr Mike Hughes of the polytechnic's School of Health Sciences explains 'Using our BBC micro and Concept Keyboard we can record every shot played in a game, for example, entering details of player, position and action. That builds up a picture of each player's style which can be shown as a graph.'

He began this work with a Commodore Pet several years ago but soon switched to using the BBC micro.

Now that his department compares notes with other colleges in Brussels and Barcelona which use IBM PCs he has bought an Archimedes. 'The compatibility helps but it's the superb graphics that are really great. A three-dimensional graph of a squash game took a while to draw with our Master but with the Archimedes it takes seconds and looks so good.'

Flights of freedom

Computers are helping blind students sample new experiences at the Royal Blind School in Edinburgh. Teacher John Ross had introduced the flight simulator *Aviator* to his partially-sighted pupils, but found that those totally without sight could not enjoy the program as there was too much data to relay verbally.

Instead of giving up he wrote his own flight simulator, *Happy Landings,* which offers instrument-only flying. The student selects instruments such as the altimeter and measurements are read out by the voice synthesiser which reads screen messages.

'Just taking off and landing can get boring so a cassette of air traffic control messages gives the pilot instructions for variety. I'm hoping to develop the program to include other features of real-life aviation,' Ross explains.

PHOTOGRAPH BY ALLSPORT/Bob Martin

THE COMMS COLUMN

■ Carl Wright, who runs the Eureka BBS for Archimedes specialists Norwich Computer Services is setting up a Comms Club, an organisation for sysops and others with an interest in bulletin boards. A monthly newsletter is planned, as well as multi-user conferencing and other interesting developments. If you are interested, contact Carl on the Eureka board on (0603) 250689, or write to him at the MicroTechnology Group, 10 Gould Road, Norwich, NR2 3QH.

■ Miracom has reduced the prices of some of its modems. The V22bis WS3000, comes down from £575 to £425, and the V22 model is reduced to £295. The budget WS4000 model (V21/V23 only) comes in at £132. Miracom is on (0473) 233888.

■ Sysops who are actively running a bulletin board can obtain further reductions – the V22bis WS3000 comes in at an amazing £250, and the Courier HST modem, which works at all speeds up to 9600 baud, and offers MNP error correction and data compression is offered at half the normal £995 price tag. Sysops only should contact Nick Hughes at Nestor Ltd., on (0635) 523811.

■ This means that sysops can buy the WS3000 for the same price as the Amstrad SM2400 modem, which is currently in very short supply. The WS3000 is very popular with sysops as it provides American Bell 103 and 212 tones in addition to the 'V' standards, and is one of the few modems to auto-scan all four baud rates correctly in auto-answer mode.

■ Dialcom (Telecom Gold) has launched Travel-link which allows UK Telecom Gold Mailbox holders to access their mailboxes and other Gold services from the USA. If you are in the US, simply dial the nearest Telenet access point, and enter 'C GOLD1xx' where 'xx' is your system number. The service costs 20p per minute. A reciprocal arrangement is available to US Dialcom users in Britain.

■ Z88 users can now communicate legally with a BABT approved modem package from Dataflex Design. The z88 Pocket Stradcom is a battery powered V21/V22 modem and is offered as a package with WordMongers' *Zterm* communications cartridge, a mains adapter, comms lead, and free Telecom Gold registration for a total of £274.85.

Zterm has been improved to include storage of preset log-on sequences for particular systems, and the Viewdata software now includes CET downloading. This system is somewhat more expensive than Cambridge Computer's own £150 option, but the latter is not BABT approved. Dataflex Design is on 01-543 6417.

■ Bulletin board spotlight this month falls on the Boffin Board run by Colin Ledwell on (0316) 642147. The board contains much of interest to BBC users, and runs at V21/V23 speeds. This is not a 24-hour board, but operates from 7.30pm to 7.30am Monday to Thursday, and continuously from 7.30pm on Friday, to 7.30am on Monday. The board is on a ringback system – this means that you should ring the board, let the phone ring once or twice, and then hang up, and immedately ring again. The second call should be answered by the modem.

If you have any comms news for David Atherton, send it to him here at BBC Acorn User, *20-26 Brunswick Place, London N1 6DJ, or to his mailboxes on Prestel 942876210 or Telecom Gold/Microlink 72:MAG11596.*

NEWS IN BRIEF

■ In addition to its normal software and resources catalogue, Fernleaf has produced a History Resources Catalogue which covers not only its own range of history materials but also related software from other publishers such as Softteach Educational and LTS, videos from a number of producers, and a range of wallcharts and books for both pupils and teachers. The idea behind the catalogue is to draw together some of the best in historical resources and present them in one place for ease of access.

■ British Telecom has released software for manipulating video signals, developed by the Computers in the Curriculum team at Kings College, Chelsea in conjunction with Telecom's own education service. The package has been developed as part of an initiative which examines the impact of information technology on our lives.

The software allows a digitised picture to be handled by rotating and flipping the image. Colour changes can be made through digital logic operations on the coded data. The package is aimed at 14-16 year olds in the electronics/IT/technology classroom.

■ *An Approach to Health-Related Physical Fitness* is a book and associated computer software recently released by the Scottish Health Education Group. The package consists of four software guides and four computer programs for the BBC B and Master on five floppy discs and a comprehensive teacher's guide. The idea of the software is to highlight the place of Aerobics and Fitness training and testing in the context of a Physical education class.

The four programs cover the Six Minute Run test, the 20 metre Shuttle Run test and Aerobic Conditioning.

Baker rejects new scientific method

by Nick Evans

The rejection by education secretary Kenneth Baker of the principles behind the Science Working Party Report on the National Curriculum has cast doubts upon the development of discovery techniques in science learning. His decision to emphasise rote-learning rather than discovering principles stems from concern about the shortfall of science graduates. The percentage of time allocated to science has had to be drastically cut. The committee said that pupils should follow a course of science until they are 16, but it now seems likely that either the level of provision will be reduced or pupils will opt for particular sciences at an earlier age.

This decision hits the integration of information technology into the curriculum, where many educational thinkers are trying to move towards what's regarded as a valuable cross-curricular approach.



Baker works on curriculum

Both the committee for Science and the Committee for Design and Technology in the National Curriculum have now reported back to the secretary of state for education. The two committees were jointly given the brief of examining the use of information technology both as a resource and in terms of the development of IT skills. The thoughts of the two committees look towards the extended use of information retrieval, simulation, design and control technology in the sciences and CDT classrooms.

However, few recommendations are made about the specific place of IT as a teaching and learning resource and there emerges no clear policy on moves towards the integration of IT across the Curriculum. This is because no specific working group has been asked to examine the cross-curricular implications of IT although all working groups are obliged to report on the impact of new technology in their own subjects. Concern is being expressed by some educationalists that neglecting what has become Britain's leading edge of curriculum development in the specification of the National Curriculum will mean that teaching methods may regress in both primary and secondary education to a parochial, subject-based approach.

Software anger

The second Resource educational conference was held at Doncaster Race Course recently. Many Exhibitors, including Acorn and four other computer manufacturers attended. Speakers were drawn from the hardware and software industries as well as educationalists and representatives from bodies such as the DES and MESU.

Software publishers expressed their concern about the future of the educational software industry and criticised the government's 16/32-bit software scheme which has caused anomalies in software purchasing. Mike Matson of 4Mation complained that his company's latest package, *Worlds Without Words* was ineligible for the scheme since it runs on 8-bit machines, whereas his four year-old *Granny's Garden* could be bought because it was available in a Nimbus version. Dissatisfaction with the Government's approach was evident among the 380 delegates.

Next year's conference, to be held once again at Doncaster Race Course on Thursday November 16th 1989, will cover the topic of 'Across the National Curriculum'.

History of IT in new book

The authors of *Information Technology For You* (Hutchinson, £4.25), Stephen Doyle and Bob Sparkes, have designed the book to be a useful introduction to IT in our daily lives. As well as covering the more obvious aspects of new technology in a form designed to appeal to beginners, the authors have examined the history of communication and also other non-IT based methods of handling information.

Students can check their understanding of the book with self-test sections.

Sound fun

All that springs to mind with the phrase 'Fourier analysis' are pages of formulae and 'calculus'. *Spectre* is designed to allow both technical and non-technical people play with Fourier analysis of sound waves. It is a stand-alone package, although it is convenient to use it with Armadillo's A448 sound sampler.

Any complex sound wave can be made by adding together several simple sine waves of different frequency – called harmonics. If you've never heard of Fourier transforms before, don't be put off – *Spectre* does all the work for you. It splits up a sound into its harmonic components, then it lets you apply filters to this transformed 'spectrum' and then it reconstructs a sound waveform.

Spectre splits into three main areas, Process, Display and Edit. Process loads, saves and transforms data. Display shows the transformed spectrums in 3D, and Edit sets up filtering envelopes.

The manual is easy to follow and contains documentation on the SWI calls the program uses. This enables mathematicians to use the very fast Fourier transform routines in their own programs. As an example, a real-time spectrum analysis program is also included on the disc. This behaves like the LEDs on stereo systems – but with a separate one for each frequency.

My only complaints are that the menu system is not particularly easy to use – there are at least three different types of menu, and each has its own method of selecting an item. More importantly, the playback routines don't work correctly under RISC OS. Overall, the package is very good, but pricey at £46.

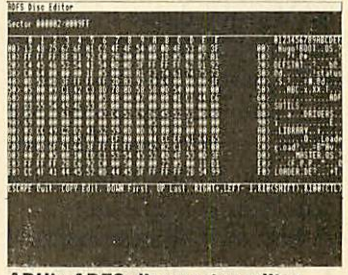
David Lawrence

Simple way to ADFS

Far too many people find the ADFS filing system difficult to use, particularly if you get used to DFS first. Pineapple Software has come up with *ADU* to help. It is suitable for both the BBC B fitted with ADFS and the necessary 1770 upgrade board, and the Master 128. It is also particularly valuable for users with Winchester discs.

Altogether 23 star commands are provided by the utility clip. Several of the 'new' commands provide instant versions of the utilities on the ADFS Utilities disc, while others offer totally new facilities. There is *FORMAT instead of AFORM; in addition there is *PURGE which can be used to empty a disc without reformatting.

As well as *CATCALL which produces a listing of the contents of all directories on the disc there is a *DIRALL which displays just the directory structure.



ADU's ADFS disc sector editor

The new backup facility is particularly good: it is very fast indeed, as it uses all the available main and second processor memory to backup a disc, and only the sectors with information on the source disc are copied on to the new disc.

Files can be found from deep in the ADFS directory structure with *FILEFIND and the hash and star wildcards are available to help. Copying programs around your discs is enhanced with *DIRCOPY, which copies a whole directory structure from one place to another. There is also a command that enables the deletion of any directory.

Instead of using *Copyfiles* to copy DFS discs to ADFS, *ADU* provides the *DFSADFS command which transfers all files from a DFS disc to an ADFS, creating any new directories automatically.

One command that certainly deserves special mention is *MENU, which enters a menu routine which displays a catalogue of the currently selected directory and allows you to browse through a whole ADFS disc with tremendous ease. It will also allow you to automatically load anything from a Basic or machine code program, any *View* family file, or a text file created with *Wordwise* or *InterWord*.

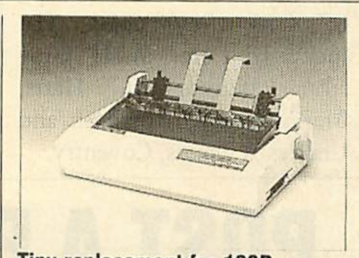
Dave Futcher

Citizen's new baby

By far the most popular low-cost printers in the BBC micro market are the Citizen 120D and Panasonic KX-P1081. Now the 120D has been replaced by the 'all-European' Citizen 180E.

It was designed and is built in Britain – neatly avoiding punitive European Community import levies – and it has characters for almost every European language.

Physically there is little to distinguish the 180E from its predecessor, except that when I unpacked it, there was a separate plug-in interface card with the familiar parallel plug. You can get a serial card to replace this if you wish. It's all quite neat, and the printer is noticeably smaller and lighter than most. Setting up the 180E with a BBC micro is simple, just a matter of changing a couple of DIP switches on the interface, plugging in the card and cable, and putting on the tractor feed unit. I find the best way to set the DIP switches on almost every printer is to use a plastic pen top – and set them for auto line-feed off (you can always use *FX6 if lines are printed on top of each other), Epson emulation, USA characters and 11-inch paper.



Tiny replacement for 120D

In use the printer proved quiet and slow, but not excessively so except in NLQ mode. Control is via the three switches on the front panel, and it seems perfectly Epson FX-compatible. One of this printer's strengths is the vast range of effects that can be applied to the text – including white on black. The quality of the fonts supplied are shown in the box.

Draft font 1
NLQ font 1
Draft font 2
NLQ font 2
Bold above, normal below
Draft font 1
NLQ font 1

Two fonts, two qualities

Overall, it's a very good printer for the price. If I had the money, I'd pay more, particularly in business, but for home use the 180E is perfectly adequate.

Graham Bell

Contacts

Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Tel: (0223) 245200.
Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511.
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Silicon Vision, Signal House, Lyon Road, Harrow, Middlesex HA1 2AG. Tel: 01-422 2274.
Simtron, 4 Clarence Drive, East Grinstead, West Sussex RH19 4RZ. Tel: (0342) 328188.

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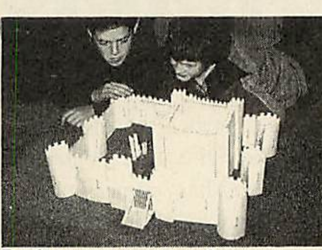
Although last month's issue mentioned that Micronet has stopped publishing our listings, it is still getting calls about them. The only way to get hold of *BAU* programs now is either to type them in yourself or buy our monthly listing discs.

In next month's issue

Programming for Sideways RAM is the theme of a major new article in next month's *BBC Acorn User*. The aim is to make writing your own ROMs simple, and the ideas are built around utility commands for *Wordwise* users.

Also starting next month is a round-up of software for businesses using BBC micros: payroll and accounting software, stock control and so on.

In *BAU*'s education section, Chris Drage and Nick Evans show how Data Design's *Designer Castles* software can be used to good effect – teaching children about medieval history and having great fun at the same time.



Design your own castle

Sam and Richard Greenhill review *Euclid,* solid modelling software for the Archimedes, and show how it was used to help design a real robot. Other reviews cover Pres' *Advanced File Manager* and a new Amstrad modem.

Plus there's all the usual *BBC Acorn User* regulars like Hints and Tips, Agora, The Games Page and the best news coverage of the Acorn world.

Winners

Congratulations to the winners of our October *Pipedream* competition, who should each by now have received a copy of *View Proffessional.* The lucky trio are: M H Gray from Buntingford, Herts, Mary Masson, Aberdeen and Charles Williams, Coventry.

Diary dates

Dates for your 1989 diary:
18-21 January. BETT '89, Barbican Centre, London. Tel: EMAP Exhibitions 01-404 4844.
21-24 January. Which Computer? Show,, NEC Birmingham. Tel: Cahners Exhibitions 01-891 5051.

BLUNDERBOX

The *Leonardo* package previewed in January's issue is published by Beard Technology of 111 Evering Road, London N16 7SL. The *Wordpower* package, also previewed in January, is published by Ian Copestake Software, 10 Frost Drive, Wirral, Merseyside L16 4XL.

The exhibition dates for BETT '89 and the *Which Computer?* Show published in last month's Diary Dates were incorrect. Check this month's Diary Dates for the right timing of these events – your chance to see Acorn's R140.

In last month's software reviews, we ommitted to say that the *Hyperdriver* ROM which was reviewed is published by Dabs Press of 5 Victoria Lane, Whitefield, Manchester M25 6AL.

And apologies to Bishop Barrington school in Bishop Auckland. Our 'School plays on' story in December should have made it clear that the school's shortage was of musicians not pianos.

Don't forget to inform us of any errors or ommissions in this issue of *BAU.*

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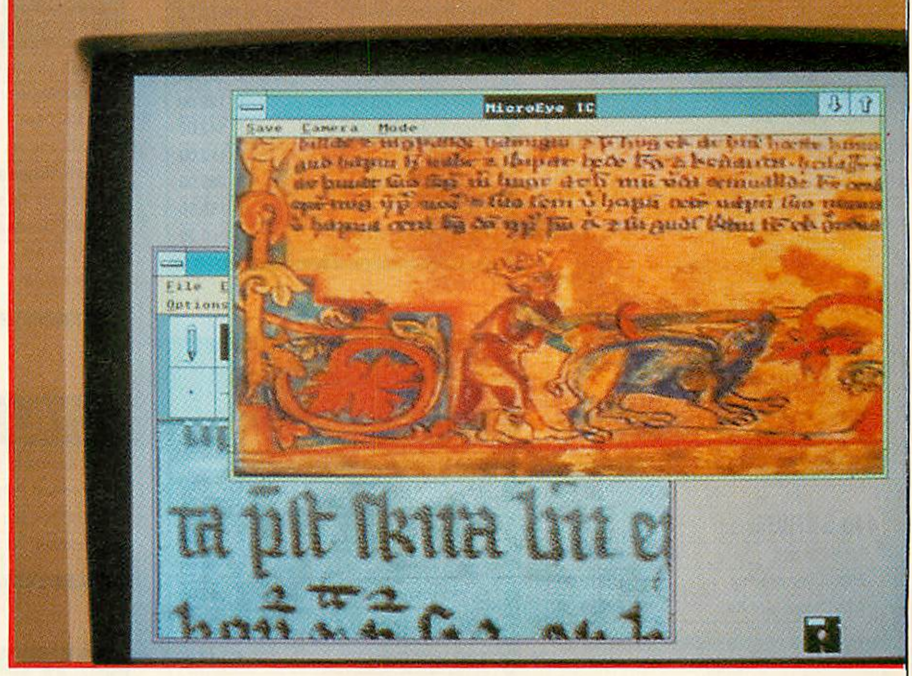
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They'd certainly be interested in Nimbus software like Aldus Pagemaker* and Pagemaker College* training systems; preparing novices on SPA's NewSpaper* classroom desktop publisher; and bringing in peripherals like laser printers, scanners and 19" monitors. The monastery might even go for the complete RM Nimbus Desktop Publisher system, complete with Pagemaker* software and laser printer.

In other words, they'd be producing prayer books and missals with the Nimbus technology that many schools, colleges and universities are already using for project work, coursework and exams; for magazines, prospectuses and programmes; for communicating with students, parents, governors and local authorities... making texts memorable on equipment (with a new three-year warranty) that creates a new publishing revolution.

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Filing from the desktop

RISC OS, the new multi-tasking operating system for the Archimedes, will be available in April and fitted as standard in new machines.

On these two pages, David Watkins gives a briefing on its capabilities, and on page 24 Graham Bell adds his comments.

The upgrade will cost £29, and includes four chips, and three discs, two full of applications. New welcome and user guides are included but a separate Basic guide will cost an extra £20.

Fitting the chips should not prove a problem to readers familiar with BBC sideways ROMs, although any backplane



and expansion boards will have to be removed. If you aren't confident, a dealer will do it for you. RISC OS comes in three parts – the operating system itself, the desktop environment and the desktop applications like *Draw* and *Edit*. We deal with them separately here.

On the new desktop the filing system icons depend on the configuration of your machine and can include floppy and hard discs, a network icon and a chip – there's a full RAM filing system. The RAMFS icon is only displayed if memory has been allocated to it, either with the *CONFIGURE command or from the Task manager. Access to RAMFS is much faster than the other filing systems.

However, don't use RAMFS for important files unless you're going to deal with them immediately, as it is easy to forget to save them.

The other use for the RAMFS is copying a group of files from one floppy disc to another on a single drive. Once the files have been selected the group can be dragged to the RAMFS window and they are copied to it in one go. Then the destination floppy is placed in the drive and the process is reversed – simple. The complex Arthur *COPY command won't be needed again.

Click the mouse on a filing system icon and you get a directory viewer window. One



Close-up of the new desktop

of the first things you will notice as you drag windows around the screen is that the whole window moves – not just the outline as in Arthur 1.20. In fact you can choose whichever effect you want. In a directory viewer, you can have the files as icons or as names, in alphabetical order or sorted by filetype.

The palette icon allows you to redefine the mode as well as the colours. Sprites are automatically rescaled and replotted when you change mode, and the operating system uses shading when too few colours are available.

The Task manager icon is used for starting new tasks, a facility intended for the specialised Archimedes user. It allows access to the multi-tasking environment. Of more immediate use is the facility to display the current tasks and memory usage. Memory allocations can be altered as you work: if your program hasn't got enough memory, then just reduce the allocation for something else and give it what it needs. The Task manager also allows access to the operating system through *commands.

Rundown on the discs

The two main discs contain applications, accessories, tools and utilities, and a few entertaining example and demonstration programs. They appear when the appropriate filing system window is called up, as 'application directories'.

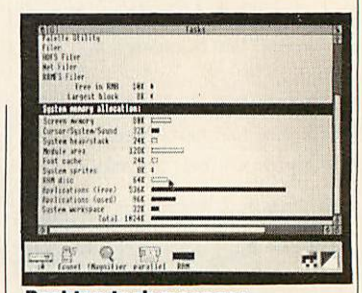
Single programs are now whole 'application directories', with the program itself, files containing data and a special file called !RUN which contains all the commands you would type to run the program. These commands are obeyed when you double-click on the application icon. The application is loaded and its icon sits on the menu bar.

The new desktop uses mode 12 by default, and a muted colour scheme with a pale grey menu bar on a mid grey background. It holds filing system icons, a palette and a Task manager icon, and new applications add their own icons to show that they are loaded and ready to run.

The most important applications are *Edit, Draw* and *Paint*. Together with *Maestro*, they are known as editors. Like the desktop, they all work in any screen mode.

Files are loaded by dragging the file's icon onto the application icon, or into an application window, or even by double clicking on the file icon. And you save by dragging a save icon into a filing system directory window. You'll soon get used to this method of file manipulation.

RISC OS offers so many advantages over Arthur that every Arc owner should be planning to upgrade as soon as it is available. It will inevitably be the only operating system to be supported by commercial Archimedes software publishers, because supporting a single operating system makes more sense than having to produce two versions. If you've got an A305, then RISC OS will run – but many applications won't. Acorn's David Bell says 'users should seriously consider upgrading to 1Mb'.



Desktop task manager

Upgrade to model B emulator

There are a number of useful and impressive utilities on the discs including a new BBC emulator called 65Host which emulates a Model B running OS 1.20, supports direct screen access and paged sideways ROMs.

Some applications, like the editors, load into memory and install themselves on the icon bar. Not all programs can do this, but TinyDirs lets you install any application program on the desktop menu bar for fast access. When it is run, a directory folder appears on the menu bar and a program icon (in fact an 'application directory') can be dragged to the TinyDirs icon. This adds the relevant icon to the menu bar. You can then run the program by clicking on its icon rather than moving through several levels of subdirectory to reach it – in essence TinyDirs remembers where the program is stored.

Other utilities include an alarm clock which offers the date and time in almost any format you could wish, with definable repeating and multiple alarms. The icon for this has moving hands on the clockface. This is the clearest example of multi-tasking on the disc. The application keeps running, redefining its own icon, even while you're 'running' other applications.

Config lets you change some of the CMOS RAM settings, as Panel did on the Master 128, and it is interesting to note that mouse speed is now configurable. There is an Econet electronic mail program, a magnifier which lets you examine areas of the screen in detail, and a diagnostic tool called Usage which shows how much of the RISC processor's capacity is being used as you work.

Will it work?

What about existing Archimedes software?

Almost all old applications still run, although they can't use the multi-tasking. Acorn says the support disc should contain patches for the most popular software.

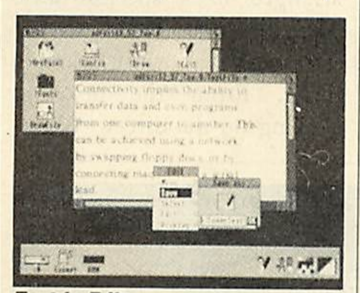
There will be some problems – software that relies on the original desktop will need a rewrite, and software that reconfigures the machine to maximise workspace will need a new !Boot file.

The tools in detail

The most powerful of the editors is *Draw*. It's a graphics editor that allows you to create pictures. A *Draw* diagram consists of a number of 'objects' – lines, boxes, curves and so on – which can be manipulated separately or together as a group.

An object can also be a sprite or a block of text, so *Draw* could even be used for simple desktop publishing by combining sprites or shape objects with columns of text.

Page layout can be on any size from A5 to A0, and orientated as landscape or portrait. Output to PostScript or dot-matrix printers is via a printer driver which is not part of *Draw* itself.



Text in Edit

Printing is easy, just use the menu to select the print option. The same printer driver can be used by other applications such as *Edit* and *Paint*, and it will print the anti-aliased fonts and graphics.

Edit is a text editor for the creation, editing and laying out of text. It is not intended to be a wordprocessor, but it allows the use of an anti-aliased font on screen. Output can be passed to *Draw*, where it can even be linked to diagrams or sprites for simple desktop publishing.

In addition to text files, *Edit* is intended to be used for the creation of datafiles, command or exec files, obey files, and to store output from a task. Obey files are sequences of *commands, used to start up an application like a boot file starts a normal program.

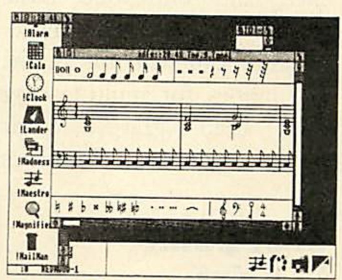
The other use for *Edit* is storing task output: you can open an *Edit* window in which you run another program. When you've finished, you can inspect the results of say, a database search, in more detail.

Paint is a sprite and picture editor. It enables you to draw and edit coloured pictures, which are saved or transferred to other programs as sprites or sprite files.

It can be used to create icons for your own programs, which can be displayed in directory file windows and on the menu bar. And you can grab sections of the screen for dumping or to use as a sprite.

A 'tools' window offers a complete range of creation and editing facilities, and work can be carried out at any magnification. Several windows can be open at the same time, with different views of the same sprite. All views are updated as one view is edited. This allows the result of magnified editing to be viewed at real size as you work.

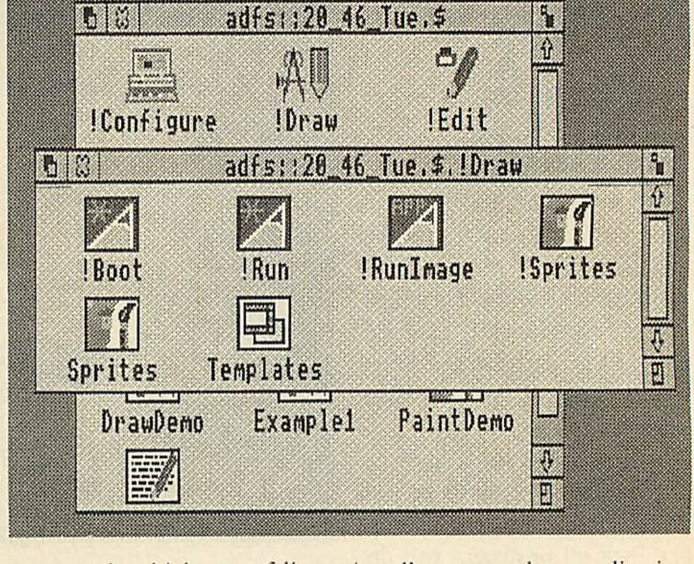
Maestro is the music editor, in which you can create and edit music on up to four staves and eight voices in seven stereo positions. It has been rewritten since it first appeared on the Arthur 1.20 Welcome disc, and now makes more normal use of the menu system, as well as taking full advantage of the multi-tasking operating system. You can listen to your latest composition while you play a game of patience, sliding block puzzle, or take potshots at an alien invader (three of the example programs on the discs).



Music, Maestro!

New modes for programmers

Graham Bell outlines some programming changes found in RISC OS (right). These include new screen modes, disc filing improvements, and, usually, multi-tasking



For the programmer, there are many changes between Arthur 1.2 and RISC OS. The most important are related to the multi-tasking, and making programs run within the desktop environment.

As suggested in *Acorn User* (Editorial, July 1988), Acorn is supplying strong guidelines on how programs should look, and stressing the value of conformity with applications on the RISC OS discs. These look consistent, and seem relatively easy to use.

The important part of the desktop world that wasn't clear from 'playing' with each application was that the Select and Adjust mouse buttons do different things more frequently than before. For example, you often need to select multiple objects using the Adjust button!

Software developers seem impressed with RISC OS, but a few have detailed criticisms. One said that in some parts of the 'multi-tasking' system you can't always do two things at once, and only one Basic program at a time is allowed. Another said that not all the possibilities for multi-tasking have been grasped. For example, you can't format a disc while doing something else. There are only three type fonts supplied, and *Edit* can only use one at a time.

Changes to the graphics include new modes (to use IBM-style VGA monitors) and modified old ones (mode 22 no longer exists, mode 23 is 1152 by 896 pixels, and modes 11, 14, 16, 17 and 23 now allow graphics); the desktop works in almost any mode. Note that the screen may not be the same 'shape' as in traditional graphics modes – the co-ordinates aren't necessarily 1280 by 1024 – and circles plotted on screen don't always appear round. It is possible to add new modes as relocatable modules.

Sprites can be scaled bigger or smaller, and you can use normal VDU commands to plot 'within' a sprite, without disturbing the screen. New drawing commands allow you to vary the thickness of lines, put arrowheads on lines, and draw spline (Bezier) curves with single SWI calls, as in the *Draw* application.

RISC OS allows a form of input and output redirection. For example, you can send the output of a process to a file or to the printer.

*CAT { > Fred }

would put a list of file names in a text file called Fred, and changing 'Fred' to 'printer': would print it out. Printer: is a 'system device', shown by the colon, which can act like a file, as can Serial: and Null: for example. You could copy a file to a serial printer with:

*COPY Fred Serial:

Application directories containing desktop programs are arranged in a specific way. The directory name should start with a ! – for example !Prog. From the desktop, clicking on the directory normally runs the application, but if you press Shift at the same time, the directory catalogue is displayed (as shown in the above illustration).

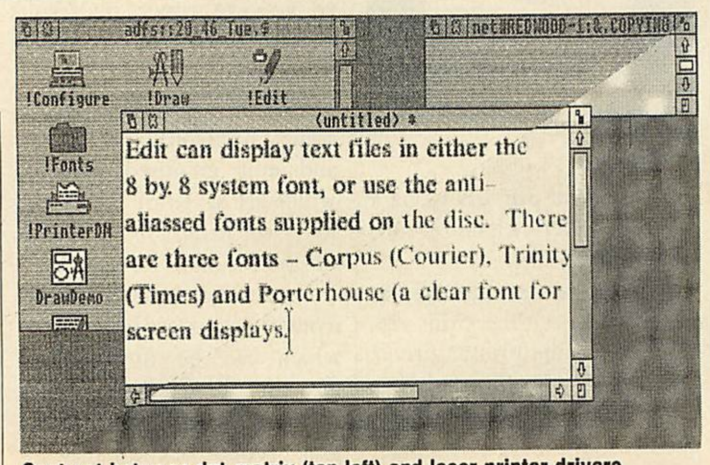
Typically, there will be several files and !Boot is run automatically when the application is started. This file is normally a set of commands to define where to store files saved, ensure the correct modules have been loaded from disc, and so on. !Boot usually calls a file called !Run, which can check whether there is enough memory free, then issue the commands to start up the program, often a file called !RunImage. The application directory might also contain 'resource files' such as sprites, window templates and other data.

The serial bugs in Arthur have been fixed, and for the comms enthusiast, XON/XOFF protocols have been built into the system range of new baud rates (including 50, 110 and 600 baud).

ADFS has been improved with an E format for floppy discs, similar to the 800k D format, which never needs compacting. It is more resistant to disc errors because two copies of the Free Space Map are kept, and bad sectors can be ignored if necessary. *Defect allows you to say where on a disc a bad sector is – and it won't be used. ADFS also works faster.

Just point to print

Printing with RISC OS is much simpler than before, with dot-matrix (right) and Postscript (far right) printer drivers supplied. Whichever driver you load should be used for all printing from the desktop applications. A file can be printed by dragging its icon on to the printer icon which is provided by the printer driver.



Contrast between dot-matrix (top left) and laser printer drivers



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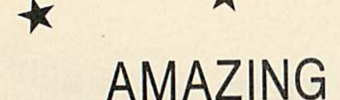
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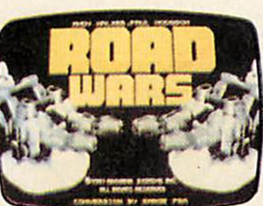

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FAX PACK

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FAX PACK brings this world of facsimile document transfer to the Archimedes. By combining the facilities of a FAX machine with the power and flexibility of a computer, FAX PACK offers considerable benefits over conventional FAX systems.

FAX PACK basically allows any document, be it printed text or graphics, or an electronic document such as a word processor file, to be sent to FAX machines anywhere in the world, in seconds. This is done by scanning (digitising) the document and then sending it digitally over a normal phone line to the receiving FAX machine which re-constructs the image and then prints it.

THE HARDWARE

The basic FAX PACK consists of a modem podule that plugs into any Archimedes computer, and the software to drive it. A variety of options are available such as scanners and power switching boxes.

The podule has connections for a scanner and power switching box (see below) and a conventional telephone line. An adapter is provided allowing a conventional phone to be paralleled with FAX PACK so that only one telephone line is required for both FAX and conventional use. However if a lot of FAX mail is going to be sent/received then a separate dedicated line is advisable.


Scanner & Sheet Feeder

Unlike many normal FAX machines the hardware also provides both auto-answer and auto-dial facilities making it convenient and allowing completely automatic operation without human intervention.

THE SOFTWARE

As part of FAX PACK this not only provides all the basic mechanisms for communicating with FAX machines but also includes high level WIMP based facilities for viewing FAXes on screen within a window, where they can be pixel edited, scaled, cropped,printed, etc.

This WIMP based software is simplicity itself to use so FAX PACK can be used in the office by staff with little or no computer experience. Of course unlike any conventional FAX machine FAXes can be viewed on screen, or filed away on disc for future reference without ever getting onto paper.

The software also allows text, word processed files, even graphics, to be automatically converted to a suitable FAX format for sending to other FAX machines. The paperless office becomes closer to reality since it is now possible to write articles, documents or letters and then send these directly to remote machines without involving paper.

However facilities are also included for printing FAXes to a range of 9 and 24 pin dot matrix, inkjet and laser printers.

SUPER FAST MODEM

The FAX podule actually consists of a 9600 bps auto-answer, auto-dial modem, and so can be used for much more than just FAX transfer. The software can detect the type of remote machine, and if it finds a similarly equipped computer (rather than a FAX machine) at the other end it can then transfer ANY file fully error checked and glitch free. And by using some very advanced transmission protocols it can transmit data 4 times faster than most conventional modems on normal telephone lines.

THE SCANNER

In order to send printed material it is necessary to digitise the page. An optional hand-held, A4 width, 200 dpi scanner can connect to the FAX podule. Being hand-held it is not only supremely compact, but it can digitise complete A4 pages, or pages from books or other awkward shaped documents.



Of course images scanned in this fashion are not only useful for FAX purposes but also for inclusion in word processor or desk top publishing programs. FAX PACK software allows company logos and signatures to be scanned, cropped and then included as part of other FAXed material.

An associated motorised sheet feeder can be supplied to go with this scanner. The scanner mounts on this sheet feeder which then automatically feeds A4 sheets under the scanner. This not only tends to be more accurate than scanning by hand, but is also more convenient.

AUTOMATIC POWER SWITCH

This external power switching box can automatically switch the computer on in order to answer incoming FAXes. The FAX podule can then answer the phone, receive the FAX and file it to disc, and then switch the computer off again. The computer can therefore be switched off and left completely unattended for very long periods of time.

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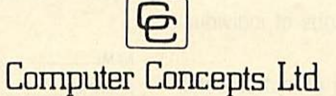
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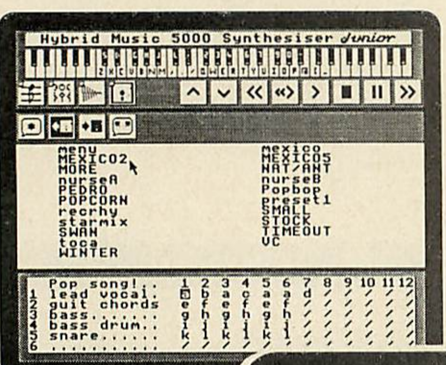
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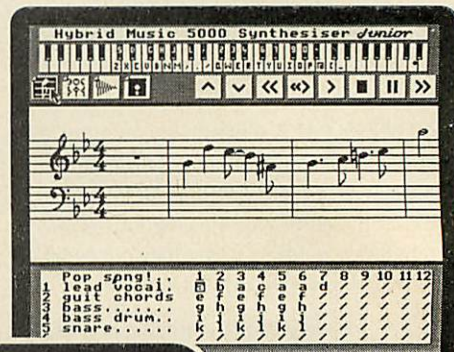
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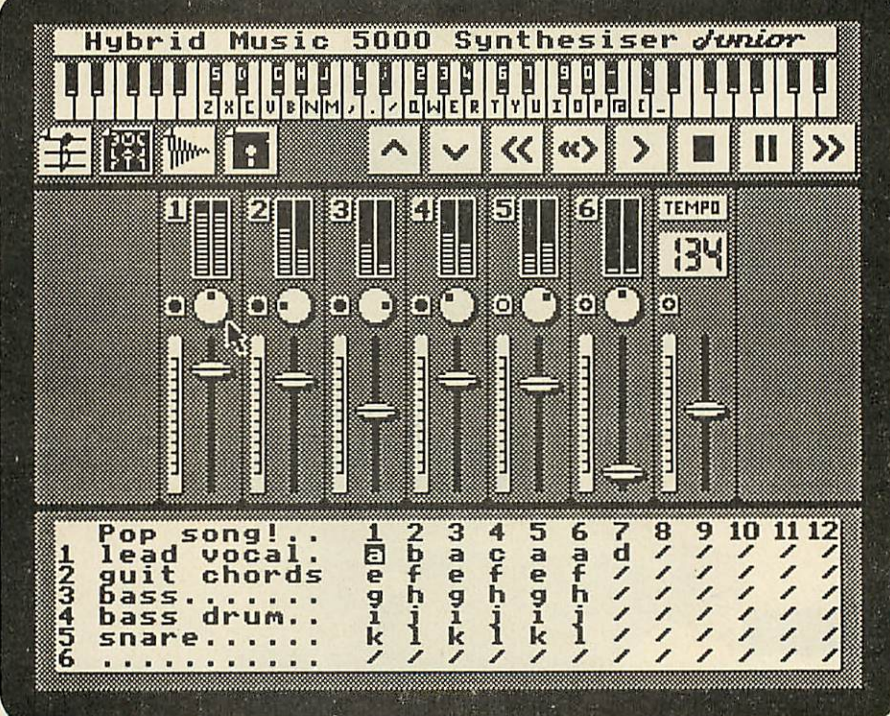
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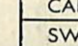
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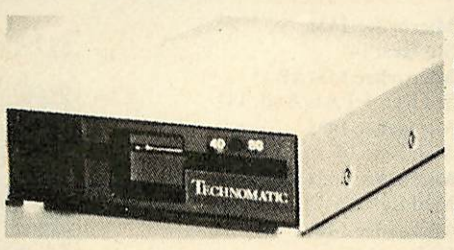
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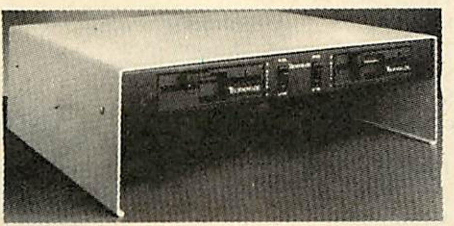
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2nd Drive Kit	£90(c)	Serial Kit	£25(d)
Mertec Adaptor	£35(c)	TV Modulator	£26(d)
Ext Drive Adaptor	£9(d)	Printer Lead	£7(d)

UPGRADE KITS

1.20S ROM	£15(d)	ADFS ROM	£26(d)
DNFS ROM	£19(d)	1770 DFS Kit	£49(d)
BASIC II ROM	£22.50(d)	Econet Kit	£55(d)

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms +2*8K RAMS	£37(c)
ATPL Battery backup kit	£18(d)
ATPL Board for BBC+ (10 Roms)	£31(c)

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SS DD	£6.50(d)
745 40T DS DD	£8.00(d)
746 80T SS DD	£12.00(d)
747 80T DS DD	£11.00(d)

(Add £1 for library case packing)

3.5" Discs in packs of 10

80T SS DD	£13.50(d)
80T DS DD	£15.00(d)

BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box.	£25(b)
50 5.25" 80 T double sided discs with sleeves in lockable box.	£32(b)
50 3.5" 80T double sided discs with sleeves in lockable box.	£60(b)

FLOPPICLENE DRIVE HEAD CLEANING KIT

5.25" Kit with 20 disposable discs	£14.00(d)
3.5" Kit with 20 disposable discs	£14.75(d)

DISC STORAGE BOXES

DB340 Lockable 40 × 3.5"	£8.50(c)
DB550 Lockable 50 × 5.25"	£6.50(c)
DB570 Lockable 70 × 5.25"	£8.50(c)
DB5100 Lockable 100 × 5.25"	£10.50(c)

EPROMS/RAMS

2764-25	£2.80	27256-25	£6
27128-25 (12.5vVpp)	£4.50	27128-25 (21vVpp)	£6
27512-25	£9	6264LP-15	£6

These prices subject to change (Carriage code d)

All prices ex VAT and subject to change without notice. See page 5 for Carriage Charges.

TECHNOMATIC

305 Edgware Road, London W2 Tel: 01-723 0233

PRINTERS

EPSON

LX800	£179(a)	**LQ500**	£275(a)
FX800	£309(a)	**LQ850**	£439(a)
FX1000	£419(a)	**LQ1050**	£599(a)
EX800	£429(a)	**LQ2550+**	£1049(a)
EX1000	£579(c)		

GQ3500 Laser Printer £1249(a)

Taxan KP815 £159(a) **Taxan KP915** £275(a)

Star LC10 £189(a)
Star LC10 Colour £249(a)
Star LC24-10 £309(a)

NATIONAL PANASONIC
KXP1081* £145(a) **KXP1082*** £172(a)
*(*includes Wysiwyg ROM + Master Lead)*

Canon Laser LBP8-II £1595(a)
Brother HR20 Daisy Wheel £349(a)
Juki 6100 Daisy Wheel £295(a)
Integrex Colour Inkjet £529(a)

PLOTTERS

Hitachi 672XD A3 4 Colour HPGL £499(a)
Plotmate A4S £379(a)
Plotmate A3M £549(a)
Roland 880 A3 Flat bed 8 col £599(a)
Variety of Plotter pens and accessories in stock.
Larger Plotters available. Please enquire.

EPSON LQ500

Epson's budget 24pin letter quality printer provides unrivalled print quality with two built in letter quality fonts and widest repertoire of type styles at low cost. Sans Serif and Roman or draft font can be selected from the front panel. Maximum resolution of 360 × 180 dpi. Friction and tractor as standard. Parallel interface. Designed for low noise operation 55dB(A).
Introductory price incl. master lead **£275(a)**

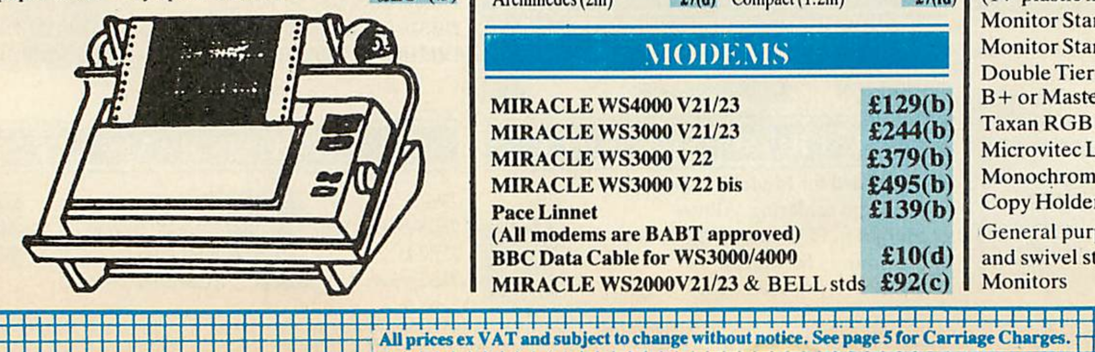
EPSON LX800

Epson's latest budget printer offers a host of new features all utilising Epson's unrivalled knowhow of printer technology and reliability.

★ 180cps draft/25cps NLQ ★ two modern fonts as std: Sans Serif and ROMAN. NLQ font selection from front panel ★ Tractor and friction feed ★ Single sheet guide with auto load switch. Original + 2 copies.
★ 3K input buffer with character downloading facility
★ Fully compatible with BBC & IBM graphics
★ Centronics interface as standard
★ Price including BBC master lead **£179(a)**

PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. **£26 (b)**



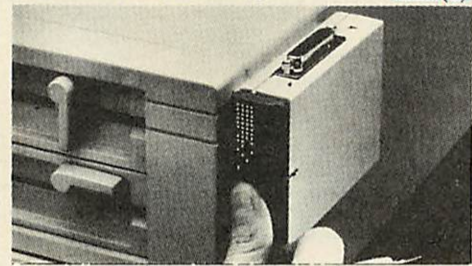
PRINTER BUFFERS SHARER & CONVERTERS

TSB 256 Auto Sharer/Buffer
256K buffer with 3 input ports. Each port scanned automatically every 10 secs until data found. PAUSE, COPY and RESET Facitilies.
Full spec on request. £169(a)

Smart Printer Buffers
Facilities include: COPY upto 265 copies PAUSE, RESET, Self-Test.
For serial: X-on/X-off, ETX/ACK or DTR/DTS protocols independently selectable baud rate for each port
PP256 256K Parallel buffer £169(b)
SS256 256K Serial buffer £189(b)

Parallel Multi-Spoolers
Allows connecting 2 printers to 2 or 4 computers
Butter allows quick dumping of data to free the computers
COPY allows upto 999 copies, SELF-TEST, PAUSE, CLEAR
MS422 4computers/2printers 512K buffer £299(b)
MS223 2computers/2 printers 512K butter £199(b)

Compact Two Way Switch 2 computers to 1 printer or 2 printers to 1 computer Attaches to the side of a computer or a printer £23(c)



Serial/Parallel/Serial Converters
Compact economical converters which support X-on/X-off, ETX/ACK, DTR/DSR protocols
C-PS Parallel/Serial converter £35(c)
C-SP Serial Parallel converter £35(c)
Add £49 to above prices for units with 64K butter

Manual Printer Sharers:

(All lines are switched).	Parallel	Serial
2 computers to one printer	£25(c)	£25(c)
3 computers to one printer	£39(c)	£39(c)
4 computers to one printer	£45(c)	£45(c)
2 computers to 1 or 2 printers	£49(c)	£49(c)

Cable sets for above sharers available for all popular computers

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable £21(c)

Paper & Labels
Plain fanfold paper with microperforation:
2000 sheets 9½ × 11″ £12(£3.50)
2000 sheets 14½ × 11″ £18.50(£4.50)
1500 sheets A4 90gsm £18.00(£4.00)

Labels/1000
Single Row 3½″ × 1⁷⁄₁₆″ (d) Triple Row 2⁷⁄₁₆″ × ⁷⁄₁₆″ £5(d)
OHP Transparencies A4 (100) £56(b)

PARALLEL PRINTER LEADS

BBC/Master (1.2m)	£5(d)	BBC/Master (2m)	£7(d)
Archimedes (2m)	£7(d)	Compact (1.2m)	£7(fd)

MODEMS

MIRACLE WS4000 V21/23 £129(b)
MIRACLE WS3000 V21/23 £244(b)
MIRACLE WS3000 V22 £379(b)
MIRACLE WS3000 V22 bis £495(b)
Pace Linnet £139(b)
(All modems are BABT approved)
BBC Data Cable for WS3000/4000 £10(d)
MIRACLE WS2000V21/23 & BELL stds £92(c)

MONITORS

12″, 14″ and 20″ MONITORS

Microvitec 1431
Std Res, 14″ £179(a)
Microvitec 1431AP
Std Res + PAL/Aud, 14″ £199(a)
Microvitec 1451
Med Res, 14″ £225(a)
Microvitec 1451AP
Med Res + PAL/Aud, 14″ £255(a)
Microvitec 1441
Hi Res, 14″ £359(a)

Philips 8833 14″ RGB
Med Res, 14″, high contract screen, TTL/Linear input, Mono/Colour Switch Stereo Sound Input. Separate controls for brilliance and contrast. £219(a)

Microvitec 2030CS
20″ Standard Resolution RGB/Comp Video £380(a)

Microvitec 2040CS
20″ High Resolution RGB/Comp Video £675(a)

TAXAN SUPER VISION 620
12″ Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible £269(a)

TAXAN SUPER VISION 625
12″ Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible. £319(a)

TAXAN 770+
MultiSysnc Autoscan 14″, ideal for utilising the hi res modes on Archimedes. Our price includes a tilt & swivel stand £449(a)

NEC MultiSync II 14″
Enhanced version of the original NEC MultiSync. complete with tilt & swivel base. Suitable for Archimedes and PC compatibles. £459(a)

MONOCHROME MONITORS

PHILIPS 7752 NEW
14″ green screen monitor.
This is a new addition to the Philips' popular mono monitors. Features include Flat screen, Inverse video switch, separate brilliance and contrast controls. £85(a)

PHILIPS BM 7502
Hi Res green screen £72(a)
PHILIPS BM 7522
Hi Res amber screen £79(a)
Tilt & Swivel Stand for Philips Mono £6(c)

MONITOR ACCESSORIES

Microvitec Swivel Base (14″ plastic monitors) £17(c)
Monitor Stand Models B & B+ £10(c)
Monitor Stand Master £13(c)
Double Tier Stand Models B, B+ or Master £24(b)
Taxan RGB Lead £7(d)
Microvitec Lead £4(d)
Monochrome BNC/Phono Lead £4(d)
Copy Holder Self Supporting A4 £15(c)
General purpose tilt and swivel stand for 12″ and 14″ Monitors NEW £15(c)

All prices ex VAT and subject to change without notice. See page 5 for Carriage Charges.

TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ. Tel: 01-205 9558 Fax: 01-205 0190

CAD/DRAWING PACKAGES

NOVACAD
Cad Package for B, B & MASTER.
(See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£49 (d)
TM Version plus Tracker Ball	£94 (d)
TM Version plus Mouse	£79 (d)
Plotter Driver Generator	£15 (d)
If purchased with Novacad	£12 (d)

MOUSE

AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£59 (d)
STOP PRESS (Pagemaker)	£37(d)
EXTRA/EXTRA (utility for the Pagemaker)	£19(d)
MAX	£17 (d)
STAND ALONE MOUSE	£34 (c)

RB2 TRACKER BALL

RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' (for use with NOVACAD & other software)	£47 (c)

AMX Mouse compatible version available.

Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

TIME WARP

Real Time Clock, Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program **£29(d)**

BBC SOFT/FIRMWARE

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£36 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£69 (b)
INTERBASE	£49 (d)

WORD PROCESSORS

ACORN VIEW PROFESSIONAL (BBC)	£69 (c)
VIEW 2.1	£35 (d)
VIEW 3.0	£45 (c)
Double View Rom Version	£42 (d)
Double View Disc Version (for Master & Compact)	£33 (d)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£8 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£42 (d)
INTERWORD	£36 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£36 (d)
WINDOMATIC (A Viewsheet Utility)	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
INTERCHART	£25 (d)
ULTRACALC	£26 (d)

MINI OFFICE II DISC Version

For B & B+ 40T or 80T	£14 (d)
For Master 80T	£16 (d)
For Compact	£19 (d)

MINI OFFICE II ROM Version

For Master, Compact, B+ & B	£43 (c)
MEGA 3Rom	£76 (b)

CC's integrated package offering Interword, Intersheet & Interchart on one 128K ROM. For Master, Compact, B+ & B

LANGUAGES

META ASSEMBLER	£145 (b)
TEAM DISASSEMBLER	£145 (b)
MACROM	£33 (d)
ACORNSOFT 'C'	£40 (c)
ACORN MICRO PROLOG	£62 (d)
ISO-PASCAL	£51 (c)
ISO-PASCAL STAND ALONE GENERATOR	£30 (d)
OXFORD PASCAL (40 or 80T) Specify B or B+	£36 (d)
OXFORD PASCAL for Master	£52 (d)
ACORN LOGO	£46 (c)
LOGOTRON LOGO	£55 (c)
BBC PUBLICATIONS OPEN LOGO	£59 (c)
ACORN LISP ROM	£39 (d)
ACORN FORTH ROM	£39 (d)
ACORN COMAL ROM	£39 (d)
Advanced BASIC Disc (for B, B+ & Master + 6502 2nd Processor)	£26 (d)
MICROTEXT	£52 (c)
MICROTEXT PLUS	£229 (b)

COMMUNICATIONS

TERMULATOR	£25 (d)
COMMSTAR II	£28 (d)
MAYA Comms Package NEW See next page for details	£49 (d)
MODEM MASTER	£11 (d)
COMMAND	£34 (d)
MASTER TERMULATOR	£34.75 (d)

UTILITIES

ACORN ADFS ROM	£26 (d)
ACORN BASIC EDITOR	£24 (d)
MONITOR (BBC Pub)	£19 (d)
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual	£9.50 (d)
Cassette	£9 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£24(d)
PRINTMASTER	£24 (d)
PRINTWISE	£24 (d)
DUMPMASTER	£26 (d)
FONTWISE PLUS	£17 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

COMPACT (all on 3½" disc)

ARTROOM	£27 (d)
FONTWISE +	£22 (d)
FONT EDITOR	£22 (d)
BETABASE	£27 (d)
WHITE KNIGHT MKII	£16 (d)

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY	£11 (d)
COMPUTERS AT WORK	Aud/EC/disc£16 (c)
PICTURE CRAFT	Disc£17 (d)
INTRODUCING GEOGRAPHY	Disc£16 (d)
MATHS WITH A STORY 1	Cass£8 (d)
MATHS WITH A STORY 2	Cass£8 (d)
NUMBER GAMES	Cass/EC£7.50 (d)
USING YOUR COMPUTER	Cass£24 (c)
THE HALL OF MIRRORS	Disc£13 (d)
MATHS	Disc+AudCas£17(d)

SECONDARY LEARNING

TECHNOLOGY & DESIGN Pt1	£21.50 (c)
ELECTRIC FIELDS	£10.50 (d)
ADVANCED LEVEL STUDIES: STATISITICS	Disc£23 (d)
ADVANCED STUDIES: GEOGRAPHY	Disc£17 (d)
INSIDE INFORMATION	Prog Cass£10 (d)
	Book£8(d) Audio Cass£5 (d)
OPEN LEARNING PACK	Disc/AudCas+book£36(b)

SCIENCE TOPICS (ST)

S.T.:WAVES	Disc£14 (d)
S.T.:RELATIONSHIPS	Disc£14 (d)
S.T.:BONDING	Disc£14 (d)
S.T.:ELECTROMAGNETIC SPECTRUM	
S.T.:ELECTRONICS IN ACTION	Disc£14
S.T.:NEWTON & THE SHUTTLE	Disc£19
S.T.:ECOLOGY	Disc/EC£19
S.T.:POLYMERS	Disc/EC£19 (d)
S.T.:CLASSIFICATION & PERIODIC TABLE	Disc£20 (d)
S.T.:FOOD & POPULATION	Disc£20 (d)
SEC.SCIENCE MICROTECHNOLOGY	Cass£7 (d)
SEC.SCIENCE:THE MOLE CONCEPT	Disc/Aud/EC£16 (c)
BIRD SPY	Disc£13 (d)
GEORDIE Racer	Disc£13 (d)

GENERAL

VU-TYPE PROFESSIONAL	Disc£19 (d)
WHITE KNIGHT MK II (for 1770 DFS)	Disc£16 (d)
BATTLEFIELDS	Cass£8.50 (d)
A VOUS LA FRANCE	Disc£20 (d)
	Book£5.25 (d) Aud Cass(2)£7 (d)
ESPANA VIVA	Disc£19 (d)
	Audio Cass(2)£8 (d) Book£6.95 (d)
	(2) £7.50 (a)
DEUTSCH DIREKT	Disc/aud/EC£16 (c)
	Book£5.95 (d)
BLACK QUEEN — A long awaited bridge game. (1770DFS)	£13(d)
BISMARCK — History of the famous battleship. (1770DFS)	£13(d)

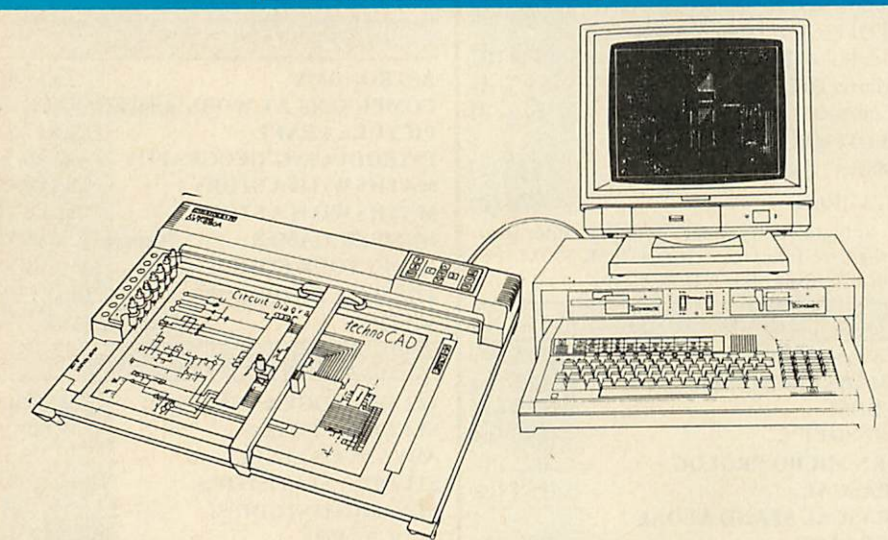
All software in this advertisement has been tested to work with appropriate Acorn Disc Filing Systems only and we are unable to comment on compatibility with any other filing system. It will be the buyers responsibility to verify such compatibility.

All prices ex VAT and subject to change without notice. See page 5 for Carriage Charges.

TECHNOMATIC

305 Edgware Road, London W2 Tel: 01-723 0233





- ★ An easy to use CAD system with pop up menus providing a user friendly interface at all stages of operation.
- ★ Input can be configured for keyboard, mouse or tracker ball. Only three keys to input all commands if input from keyboard.
- ★ Virtually no limit to the size or complexity of the drawing that can be created. Powerful zoom facility allows a A0 size drawing to be viewed from single screen or a single screen can be enlarged to AD size. Continuous planning across a drawing by specifying co-ordinates.
- ★ Lines, arcs and circles can be drawn with ease and in user defined colour and thickness. These can be modified at any stage of drawing.
- ★ User definable grid and scale, together with on screen display of dimensions, and co-ordinates enable easy and accurate drawings.
- ★ Multi layering capability with 8 levels allows superimposition of drawings.
- ★ Powerful icon utility allows any shape or drawing to be saved to a library as an icon. Icons can be recalled from the library and palced anywhere on the screen drawing at required scale and orientation.
- ★ Toolkit program allows customisation of files, utilities and peripherals.
- ★ Drawings can be scaled on screen to suit the plotter or printer in use. A maximum resolution of 0.01mm is available. Pre-configured drivers for many popular plotters and a driver generator for any BBC compatible plotter is included. Printer drivers for Epson 9 pin and 24 pin printers are included as standard as is the facility for installing drivers for other printers.

FREE EVALUATION DISC AVAILABLE
Phone for your copy
£99(c)

BOOKS

No VAT Carriage Code (c)

LANGUAGES

- 6502 Assy Lang Prog £19.95
- 6502 Programming £13.95
- 8086 Book £23.95
- Acorn BCPI User Guide £15.00
- Acorn FORTH £7.50
- Acorn LISP £7.50
- Acorn ISO Pascal Ref Manual £10.00
- Intro to COMAL £10.00
- Intro to LOGO £7.50
- Micro Prolog Ref Manual £10.00
- Introduction to Turbo Pascal £14.95
- Prog the Micro with Pascal £8.50
- The Supervisor's BBC Micro £10.95

BBC MICRO GUIDE BOOKS

- Inside Information £8.95
- Maths Prog in BBC Basic £7.95
- The Friendly Computer Book £4.50
- Toolbox 2 .... £10.95

ARCHIMEDES

- Archimedes Reference Manual .... £29.95(b)
- ARM Assembly Language Prog .... £12.95(b)
- Inside Autosketch .... £15(b)

PROGRAMMING/UTILITY

- Advanced Sideways Ram User Guide £9.95
- Advanced User Guide (BBC) £15.95
- Applied Assembly Language on the BBC £9.95
- BBC Micro Advance Programming £9.95
- BBC Micro Ref Guide (B Smith) £10.95
- BBC Micro Sideways ROM's RAM's £9.95
- Guide to the BBC Rom £9.95
- Beginners Guide to W.P. £7.95
- Mastering Assembly Code £8.95
- **Mastering Interpreters & Compilers** £14.95
- **Master Operating System** £6.95
- **Mastering View, Viewsheet & Viewstore** £12.95
- **View by B. Smith** £12.95
- View 3.0 User Guide £9.00
- Viewstore User Guide £9.00
- Viewsheet User Guide £9.00
- Wordwise Plus £9.95

SOUND & GRAPHICS

- Computer Graphics & CAD Fundementals £9.95
- Mastering Music £6.95

DISC DRIVE SYSTEMS

- Advanced Disc User Guide £16.95
- Disc Book £3.50
- Disc Programming Techniques £7.95
- Disc Systems £6.95
- File Handling on the BBC £6.95
- Discovering Disc Drives .... £POA
- Practical Disc File Techniques £5.95
- Mastering the Disc Drive £12.95
- Mastering DOS plus £12.95

APPLICATIONS

- Interfacing Proj for BBC £6.95
- BBC and Small Business £5.75
- The Software Business £5.50

Mastering Operating System (David Atherton) £6.95

PRINTER ACCESSORIES

EPSON ACCESSORIES:

- **8143** RS232 .... £32 (d)
- **8148** + RS232 + 8k .... £79 (d)
- **IEEE 488** .... £40 (d)
- **Apple II** .... £40 (d)
- Colour option of EX800/1000 .... £55 (d)

TRACTOR FEEDERS

- **LQ800** .... £44 (b)
- **LQ1000** .... £55 (b)
- **LQ850** .... £70 (b)
- **LQ1050** .... £85 (b)
- **LQ2500+** .... £90 (b)
- **EX800** .... £85 (b)
- **EX1000** .... £90(b)

SHEET FEEDERS:

- **LQ800/850** .... £159 (b)
- **LQ1000/1050** .... £189 (b)
- **EX800/FX800** .... £159 (b)
- **EX1000/LQ2500+** .... £225 (b)
- **FX1000** .... £189 (b)

Ribbons:

- FX/FX100/100 +, FX105 .... £7 (d)
- RX/FX80, FX85/800 .... £4 (d)
- LX80/LX800 .... £4.50 (d)
- LQ800/850 .... £6 (d)
- LQ1000/1050 .... £7.75 (d)
- EX800/1000 Black .... £7.50 (d)
- EX800/1000 Colour .... £16.80 (d)
- H180 Pen Set (Aqueous/Ball point) .... £8.25 (d)

HITACHI 672 Plotter

- Aqueous Pen Set six pens .... £18.50 (d)
- Oil Based Pen Set six pens .... £25.00 (d)

TAXAN CANON Accessories:

- Ribbon, KP810/815/910/915 .... £6 (d)

Star Printer

- NL10/LC10 Sheet Feeder .... £55 (b)
- NL10/LC10 Ribbon .... £4.50 (b)

National Panasonic KX P1080/81

- Spare Ribbon .... £4.50 (d)
- KXP3131 Tractor .... £90 (a)
- KXP3131 Sheet Feeder .... £189 (a)
- KXP3131 Ribbon .... £4.50(d)

JUKI 6100

- Tractor Feed .... £149 (a)
- Sheet Feeder .... £219 (a)
- Ribbon (Carbon) .... £2.00 (d)

BROTHER HR20

- Sheet Feeder .... £229(a)
- Tractor Feed .... £116 (a)
- Spare Ribbon Nylon .... £3.00 (d)
- Spare Ribbon Carbon .... £4.50(d)

INTEGREX INK JET COLOUR PRINTER

- Spare Ink Cartridge Black .... £8 (d)
- Spare Ink Cartridge Colour .... £14 (d)
- Paper Roll .... £7 (d)

Printer Leads:

- BBC Parallel Lead (1.2m) .... £6 (d)

PAPER & LABELS

Plain Fanfold paper with micro perforations:

- 2000 sheets $9\frac{1}{2}'' \times 11''$ 60 gsm/sq m £12 (£3.50)
- 2000 sheets $14\frac{1}{2}'' \times 11''$ 60 gsm/sq m £18.50 (£4.50)
- 1500 sheets A4 90 gsm £18 (£3.50)

Labels/1000:

- Single Row $3\frac{1}{2} \times 1\frac{7}{16}''$ .... £5.25 (d)
- Triple Row $2\frac{7}{16}'' \times 1\frac{7}{16}$ .... £5 (d)

TECHNOMATIC
MAIL ORDER & RETAIL
Techno House
468 Church Lane
London NW9 8TQ.
Tel: 01-205 9558
Fax: 01-205 0190

RETAIL SHOPS
468 Church Lane. London NW9 8TQ.
Tel: 01-205 9558 Fax: 01-205 0190
(close to Dollis Hill ⊖)
West End Branch
305 Edgware Road. London W2
Tel: 01-723 0233. 01-402 0444
(near Edgware Road Tube) ⊖

For fast delivery telephone your order on 01-205 9558 using VISA/Access Card





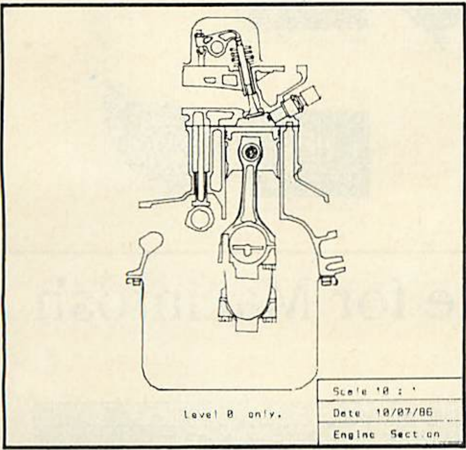
Orders welcome from government depts & educational establishments

All prices ex VAT
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Courier)
(b) £2.50
(c) £1.50
(d) £1.00

NOVACAD Computer Aided Draughting System

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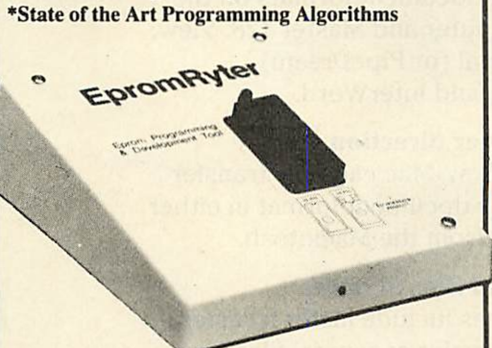
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VIEW»MAC

View»Mac Version 2 – Converts View, InterWord, and Wordwise Plus documents to MacWrite

View»Mac has already established itself as the most effective way of transferring View documents to the Macintosh.

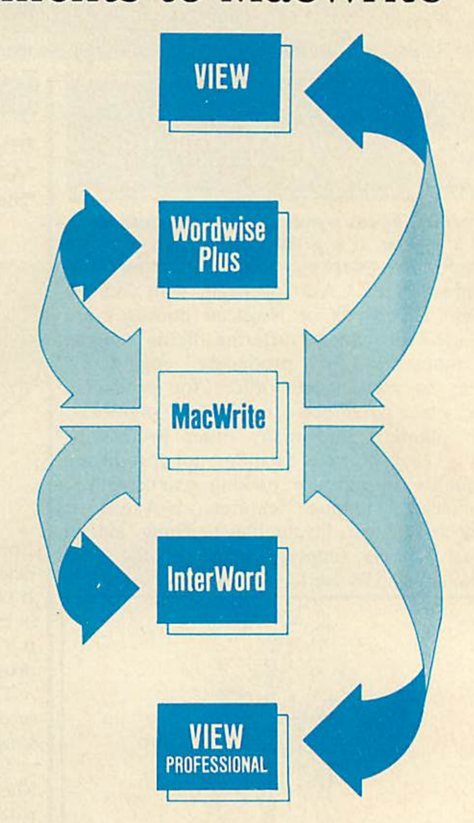
Now View»Mac has been extended to cater for all the main document formats on the BBC Microcomputer and Master 128: View, View Professional (or PipeDream), Wordwise Plus, and InterWord.

Transfer in either direction
Furthermore, View»Mac can now transfer and convert any document format in either direction: to or from the Macintosh.

Transfer several files at once
Other advantages include faster transfer, and optional transfer of several files, or a complete folder, in a single operation.

View»Mac Version 2 is available for just £59 plus vat (educational price). The serial cable to connect the BBC Microcomputer and Macintosh is available for £25 plus vat.

Existing users of View»Mac can upgrade to Version 2 for £19 plus vat.



BBC BASIC

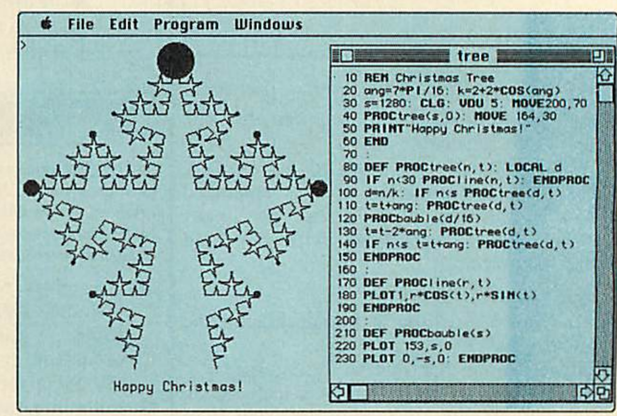
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BBC BASIC has become established as the major programming language used and taught in UK schools. Its structuring features, such as named procedures and functions with arguments, make it an ideal language for learning to program.

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BBC BASIC for the Macintosh includes an integral editor, for the fast entry and editing of programs, and built-in menu commands for transferring programs to and from a BBC Microcomputer.

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- Compatible with Macintosh 512KE, Mac Plus, Macintosh SE, and Macintosh II.



- Includes features from BASIC V on the Archimedes, such as: WHILE...ENDWHILE, CASE, multi-line IF...ENDIF, and the graphics extensions: CIRCLE, ELLIPSE, RECTANGLE.

Price
BBC BASIC for Macintosh is available for £149 plus vat (educational price), with a full User Guide and fourteen example programs.

AU88/6

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HINTS & TIPS

LABELS IN VIEW

This month we offer a utility to help you print your address labels, plus a prefix command for ViewSheet, not to mention a cheaper OverView

David Atherton

Alan Skinner of Blackpool uses Electron *View,* and he has sent us this tip for producing address labels. It keeps all the names and addresses in a nice compact form, and allows totally flexible editing of the label format. Yet it means that you don't need to buy a specific labeimaking program.

The method is to use a combination of the macro facility and the ability to print multiple files.

The first thing you should to do is set up a file for the label format as a new *View* document. Alan provides the example in the illustration.

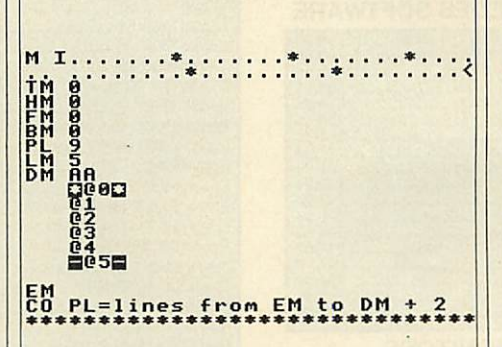
The first four commands reduce the margins to zero – otherwise each label would contain nothing but margin. The 'page length' is set to nine lines, and a small left margin set.

The – and * symbols represent highlights 1 and 2. The two-letter commands must be entered in the command margin by pressing Shift-f8.

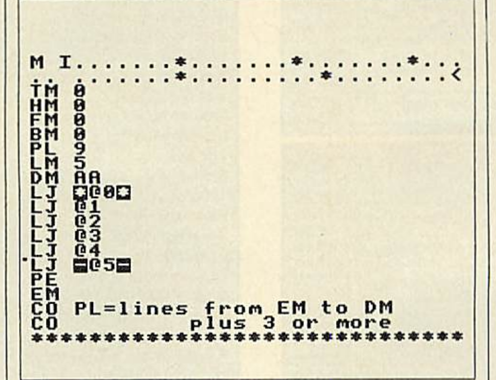
The comment at the bottom has been placed to remind you that the PL setting must equal the number of lines between DM and EM, plus two to take account of the header and footer lines – which will print blank. This must of course be the same as the number of lines between the top of one label and the top of the following label. Fortunately, most labels are placed on a sprocket roll a fixed number of inches or half inches apart. The standard printer has a linefeed of one-sixth of an inch, so everything should work out. A normal 1.5-inch-deep label is exactly nine lines deep.

The second illustration shows a different way of doing the same thing, though it results in one fewer possible line of text per label.

Once you have created either type of 'template', save it under a meaningful name. If this one is for letters, you could call this 'Labels'. The next stage is to create the database of addresses. This is done very simply by starting a new *View* file and typing:



View macro for 9-line labels



Alternative macro to do the same

```
AA J. Smith,1 High St.,Anytown,Berks,AN1 2YT
AA B. Jones,2 Low St.,Beeton,Anytown,Berks,AN9 0ZZ
```

and so on. Note that as you have defined six parameters (@0 to @5) in the Labels template, you can use anything between none and six parameters in each address.

If you wish to leave a blank line, just type two commas between the relevant items in the address. In fact this won't work with the second type of template: LJ with no parameter doesn't print a blank line. But the PE (page eject) command still ensures the text on the labels keeps in step.

The AA parameter should be typed in the command margin. Don't put a space after the commas in the address, because the character after the comma is considered to be the start of the next item, and if you inserted a space, the address would not line up with the name on the label. When you have created your list of names and addresses, save that file as well. You could call it Friends.

After fixing the labels in the printer, and making sure the printhead is aligned to the correct position to print the first line of the first label. Then at the view prompt, type:

```
=>PRINT LABELS FRIENDS
```

View will load the labels template, and 'learn' the macro definition, but as there is no printable text in the template, it won't print anything. Then it will load the next file Friends, and start printing labels accordingly. If you want two sets of labels, you can type:

```
=>PRINT LABELS FRIENDS FRIENDS
```

The program will print you two sets of labels. So far so good, but the system can be even more flexible. Let's say that you also have a separate file like Friends, holding a list of business contacts or customers that you use for commercial mailshots. Obviously you would type PRINT labels Custs or something like that. When it's Christmas, you may want to send Christmas cards to both friends and customers. No problem, and no need to merge the two files. Just type:

```
=>PRINT LABELS FRIENDS CUSTS
```

and both sets of labels will be done. This idea can of course be developed further to allow different groups of people to be saved in separate files, and selective label printing done.

Also, the labels themselves can be further customised. Even with address labels, there are many types around, for



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example one-across, two-across, four-across, and of varying depths. If you are using four-across labels and want the same name four times, then this is perfectly straightforward – the macro definition would just include the variables @0, @1, @2 more than once:

```
.. >.......*.........*.........*.<
DM AA
   @0       @0       @0       @0
   @1       @1       @1       @1
```

Unlike the single-width labels, the setting of the tabs on the ruler is important here, as it controls where the text starts on each label across. These are of limited use for names and addresses, but could be very convenient for other applications, such as box labelling.

It is perfectly possible to use a different template with the same set of data to print the information out in a variety of different ways. You could for example have a different template file with a different PL number for bigger labels. So PRINT label12 Friends would print the list of addresses on two-inch labels. Or for example the macro:

```
DM AA
   @0, @1, @2, @3, @4, @5
EM
```

would print out the names and addresses in the same format as they are entered (except that a space is entered after each comma).

Just to complete the picture, it may be that you already have your list of names and addresses, but not in the right format, and wish to put them into *View* to use this system. To do this automatically, (ie with a program) you will need to know the format of a *View* file with macro definitions. This is simply (for each line) a byte 128, followed by the two macro letters, in this case 'AA', followed by the text, and terminated by a carriage return.

If you have the list as a text file, perhaps in the conventional form of separation by carriage returns, with a blank line between each name and address, then you can convert this using *Edit*, the editor on the Master 128. The first stage is to load the text file into *Edit*, by typing *EDIT <filename> and convert the data from:

```
John Smith
1 High St.
Anytown
```

format, to one address per line form. To do this, global search and replace (f5) is used. First you need to stop the blank lines being changed, so alter them to something unique:

```
<f5>$$/!!
```

When this is done, press f5 again and type:

```
$/,
```

to change the carriage returns between the lines of each address to commas. Finally press f5 again and type:

```
!!/$
```

to change the unique bits to carriage returns. Ignore the odd displays after stages one and two.

You should end up with roughly the right layout for the macro file. (Incidentally, the data at this stage is a comma-separated format, a form readable by Lotus 1-2-3 and many other programs on the IBM PC.) Now the macro definition has to be entered. Move to the top of the *Edit* file, and press Return to leave a blank line at the top. Using Global Replace once again, type:

```
<f5>$/$¦!¦@AA
```

This replaces each carriage return with a View margin command. A strange symbol will appear on each line against the left margin. However, the work is done, and you can save the file by pressing f3.

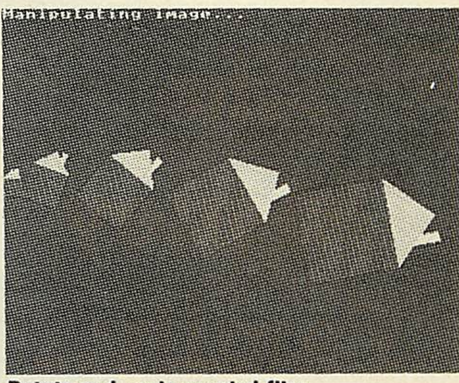
This file can now be loaded into *View* and used. Note that the way *Edit* works causes a blank AA definition to be left at the end of the file. You can delete this either in Edit or *View* as you wish. Leaving it in will cause one blank label to be printed when the file is used. Editing techniques similar to those used here could be performed in other text editors such as *Wordwise Plus*.

£5

IMAGE MANIPULATION

Peter Miller from, Essex, has followed up the graphics spooling technique described in *Acorn User* in June 1987. He's worked with the spool files created to rotate and resize the images. His program is very simple, but it is effective.

The demonstration program on the yellow pages draws a house, which is spooled as it is drawn. The drawing can only use VDU, PLOT, MOVE, DRAW,



Rotate and scale spooled files

and GCOL commands, as all these translate down to simple VDU sequences.

To manipulate your own images, you should open a *Spool file while you perform the original drawing, and close the file when it is complete. To redisplay and modify the picture, *Exec the picture file, and then call PROCimage with angle and scale parameters. The angle should be given in radians, either negative or positive. Peter points out that you can place the picture anywhere on screen by redefining the graphics origin with VDU 29 – provided that VDU 29 is not one of the sequences in the spooled file.

The Exec command works by placing all the graphics codes from the file into the input buffer as if they had been typed at the keyboard. So the program reads its data using GET, which returns the next character from the keyboard buffer. Rotation is achieved by using standard trigonometrical functions, which works well for lines and triangles.

£5

PREFIX FOR VIEWSHEET LINK FILES

Anyone who uses *View Sheet*'s Link files will know that one of the annoying limitations is that they have to be in directory V. It is possible with ADFS to create several subdirectories, each of which contains a further directory called V. But it would be nicer, thought Brian Ross of Glasgow, if this limitation were removed. Brian has written a simple utility which does this, allowing you to specify a pathname, in much the same way as *ViewStore's* Prefix command.

To use the program, run listing 2 in the yellow pages. It will ask you for the full name of the directory where link files should be stored, and then it assembles and creates a file called Vprefix. This file should be put in the library of an ADFS

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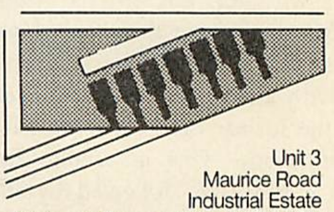
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disc, or in the current directory for DFS.

Before starting to use *ViewSheet,* type *Vprefix to activate the system. Instead of V, the directory you specified when assembling the program will then store the link files. This means that you can store groups of link files wherever you want, without necessarily having a V directory at all. Also, you can work with say floppy discs, but have the link files handled on hard disc, or have a spreadsheet file on one floppy with the link file on a second.

The program works by redirecting the Osfind routine to Brian's patch. If A=0, (the file is being closed) the normal operating system routine is called, otherwise the filename is tested to see if it begins with V and a full stop. If so, the filename minus the V and full stop are copied to the new pathname as specified in the label pathname. The X and Y registers are then altered to point to the new filename. This results in the file being opened in the desired directory.

£10

CHEAPER KEEPER

Also from Brian Ross comes a short and simple method of emulating the Keeper feature found in the *OverView* package. This is a single cartridge for the Master 128 which contains the entire *View* family. The Keeper allows you to change from one *View* family application to another with the minimum of fuss, without needing to save the document you're working on – so you can be working on a spreadsheet, pop into the wordprocessor to write a letter, and then return to the spreadsheet. The keeper automatically saves all your work in sideways RAM and restores it when you swap back.

As Brian already has all the *View* family ROMs, and because the *OverView* system isn't available for the Electron, he decided to duplicate the Keeper functions using the disc drive instead of the sideways RAM.

To preserve a *View* family application, you need to save three areas of memory: &00 to &8F, &400 to &7FF and 'user memory'. In Basic, user memory stretches from PAGE to HIMEM, so you can find out the addresses to use with your system by typing PRINT~PAGE and PRINT ~HIMEM. In Brian's case this segment is from &E00 to &7FFF.

The system he describes shows the principles of operation; you will certainly want to customise it. The system assumes that you are using ADFS – on DFS, you will obviously have to use different (shorter) filenames, and won't be able to hide the control files away in a separate directory. For a system comprising of *View, ViewSheet and ViewStore* first create four directories – $.LIBRARY, $.WORDFILES, $.SHEETFILES AND $.STOREFILES. Next select LIBRARY as the current directory (*DIR & LIBRARY), and create six text files. Use *View* and its Write function to save the files, rather than the more usual Save. The files are listed on the yellow pages. Next you should set up various dummy datafiles in preparation for use. Type:

```
*Lib $.Library
*Dir $.Wordfiles
*Word
*Wosave
*Dir $.Sheetfiles
*Sheet
*Shsave
*Dir $.Storefiles
*Store
*Stsave
```

The system should now be ready to use. For example if you are in *View* and wish to enter *ViewSheet* type:

```
*Wosave
*Shload
```

The load file can be customised by including your favourite key definitions and so on too. These would be placed after all the other items in the control files. In fact, the function keys can be programmed to switch between applications, so you could program say f0, f1 and f2 to select *View, ViewSheet,* and *ViewStore* respectively.

You can move between applications in under 20 seconds (even on an Electron) with the files shown above when using the ADFS. Brian has a RAM disc which speeds things up to about five seconds, and hard discs should perform the switch in a similar amount of time.

Some changes are required for other filing systems. If you're using DFS, then you are restricted to seven-letter filenames, and one-letter directory names. Plus you might easily run into the 31 file limit. The best thing to do is put all the storage files and the six control files on drive 2, and set up this surface as the library by typing *Lib :2.$. Also the normal Acorn DFS does not allow you to exec text files by typing *<filename>, so you must type *Exec wosave, and so on. Do this in the setup procedure as well. This can be shortened to '*e.wosave'. The Watford DFS does allow you to *Exec files automatically, so this is unnecessary.

If you don't have shadow RAM, then change the mode number from 128 to your preferred mode of operation, and alter the *Save parameters for your value of PAGE and HIMEM.

£5

OPEN FILES LIST

One of the useful features of the Watford Electronics DFS, which does not appear in the standard Acorn filing systems is the *FILES command, which lists the handle numbers, PTR# setting, and extent of any open files. This is very useful when debugging programs which house files, and also to resolve problems with commercial packages, which tell you a file is open when it shouldn't be.

Joe Abley of Bedford has come up with a machine code utility which does the job for any Acorn filing system. To use the program, run the listing in the yellow pages. It will create a machine code program called Files, which lives at the usual place in page &9. If you're using ADFS or Econet, the program should be placed in the library. To use the utility, type *Files, and all open files will be listed. If no files are open, the program just returns, and no text is listed. Note that when using Econet, three extra handles are displayed relating to the CSD, URD and library directory channels: these can be ignored.

The operating system does not provide any legal method of determining whether a file is open, so *Files determines the upper and lower file handle limits using a call to the Fscv vector with A=7. It then tries to read the pointer and extent of every handle appropriate to the current filing system. If a file with that handle is not open, 'Channel' error occurs, so the program intercepts the BRK vector, traps this error and ignores it. It then tries the next handle number. When an open channel is found, the information is obtained from Osargs and printed.

All submissions – hints, tips, programs or simply ideas – should be sent to Hints and Tips, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

ARC AGORA

RANDOM REPRODUCTION

A screendump routine for your 24-pin printer, some smooth sprites and something circular are among this month's offerings

David Acton

After much teasing from various fronts I finally conceded that the paperless office was not to be, and purchased an Epson LQ-500 printer. So, for all Epson-compatible 24-pin owners, here's a printer-dump module just for you.

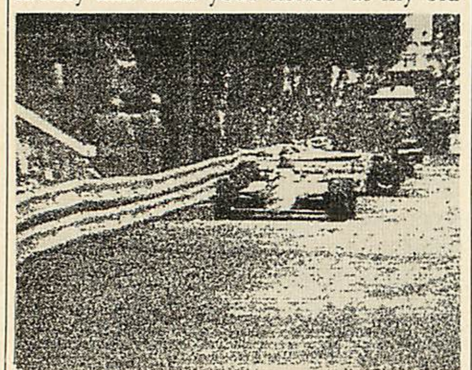
Listing 1 on the yellow pages assembles and saves a module called BAUPrint. Simply load this module with *BAUPrint or *RMLOAD BAUPrint, and you will be able to use the printer dump command *BAUDump24.

Several parameters may be appended to the *BAUDump24 command, namely:

```
-type <0-7>
-shades <2-256>
-contrast <0-64>
-invert
```

The dump type is specified by a number in the range 0-7. This value specifies the resolution of the dump and the types available are summarised in table 1. In essence, types 0 to 3 are 8-pin dumps, and types 4 to 7 are 24-pin dumps.

The latter will produce better results but will take longer – 'you pays your money and takes your choice' as my old



24-pin dump module

Headmaster used to say.

The number of shades can be any power of 2 from 2 to 256. Before dumping a graphics screen, the current palette is examined and for each colour an 'intensity value' is worked out. The value is used to convert a dot of a particular colour on the screen into the relevant 'grey-scale' so that realistic monochrome dumps may be produced. Dumping with two shades is particularly good for 'simple' screens containing text or simple graphics; digitised pictures come out well with 256 shades selected.

The contrast value (0-64) is used primarily to brighten up dull dumps. The default value is 16, but using a value of around 24 or 28 can often improve the final result – particularly if you're using one of the high resolution dump types (type 6 or type 7).

Finally, appending -invert to the dump command causes the colours to be inverted. This is handy when doing dumps of screens containing text. Without -invert, there is a danger of seriously reducing your ribbon's life by printing out large black areas.

So for example, to dump the current graphics screen using dump type 6, 16 shades and a contrast of 24 you would use the command:

```
*BAUDump24 -type 6 -s
hades 16 -contrast 24
```

Note that each of the parameters may be abbreviated to its first letter, so you could use *BAUDump24 -t 6 -s 16 -c 24 instead. The command may either be typed in directly, or included as a line of your own program.

The reason for the title of this piece comes from the way grey-scales are generated. Normally such scales are read from a table of bit-patterns, and Dave Lawrence's Hewlett Packard LaserJet laser printer dump (the Top of the List from the November 1988 issue of *Acorn User*) uses this technique.

Imagine each dot on the screen emerging as a four-by-four grid of dots on the printer. A dark-coloured screen dot might be reproduced as a four-by-four grid in which 13 or 14 of the grid-squares are filled in. A light colour would produce an almost empty grid.

-type value	pins used	horizontal density (dots per inch)
0	8	60
1	8	120
2	8	120 (1) (2)
3	8	240 (2)
4	24	60
5	24	120
6	24	180
7	24	360 (2)

Notes:
(1) this is 'high-speed' version of type 1
(2) in these modes, adjacent dots are not printed.

Table 1. Printer dump types

BAUPrint achieves this by a different method using random numbers instead of a table of bit patterns to work out how many dots should be filled in.

The shade of a particular dot is read from the screen and reduced to a number between 0 (black) and 255 (white). A random number between 0 and 255 is then generated and, if the shade of the dot happens to be less than or equal to the random number, the point is plotted on the printer.

So, if a screen colour is assigned a shade of 64, one in four dots will be plotted on the printer which will correspond with that screen shade.

This means that although we don't actually know whether any particular dot (on the printer) will be filled in, the overall effect will be correct. The result is a 'grainy' but rather realistic look that is particularly attractive when dumping

digitised pictures or other 'half-tones'.

Regular readers will be familiar with relocatable modules by now so the first part of listing 1 should not be too surprising. The module header is standard and has been described in detail in previous Agoras, as well as being well documented in the Programmer's Reference Manual part 2. The dump routine itself starts at .audump. Default values are set up first: 2 shades, a contrast of 16 and a dump type of 4. This way, using *BAUDump24 with no parameters provides a quick and handy way of printing out a simple screen.

Any parameters you have typed after the dump command are then decoded. Unrecognised parameters of numbers beyond the allowed ranges will produce the error 'Invalid parameters'.

The possible extensions to *BAUDump24 are listed at .suffices. Once a parameter has been recognised, the appropriate branch is made (at .foundone). I've used an ADD pc instruction to perform the necessary indirection, and 4 bytes of padding (EQUS "ROCK") to ensure that we jump to the right branch. (Any four-letter word would have done of course...) Numeric parameters are decoded using the SWI "OS_ReadUnsigned". This is contained within the subroutine .getnum.

The colours on the screen are converted into brightnesses by reading their red, green and blue intensities and then 'weighting' these three component hues accordingly using the table at .factors. The chosen contrast value (if specified using -contrast) is also taken into account and brightnesses are inverted if -invert was appended to the dump command.

The screen-dumping itself is fairly standard, being the equivalent of a few nested FOR...NEXT loops in Basic. For each dump type there are four parameters stored in the table .dumpdata. The first is the x-step, multiplied by &10000. The second is the appropriate control code to send to the printer. The third is the y-step (again multiplied by &10000), and the last is the number of columns of data which are to be sent to the printer per line of graphics.

You will notice that parameters for the last four types (the 24-pin dumps) have a few 'divide-by-3's present. This is simply because when you are using 24-pins the vertical resolution of the printer is effectively tripled.

If you haven't got a 24-pin Epson-compatible printer but feel you may like to convert listing 1 to work with another type of printer, the changes will in many cases be minimal. Because the first four dump types use only eight pins they should work with 8-pin printers too – you will probably need to change the 'vertical spacing' however.

This is set up at line 1650: the control code sequence 27, ASC"3", n tells 24-pin printers to move the paper up n 180ths on receiving a line-feed. As a point of interest, vertical spacing on 8-pin printers is measured in 216ths of an inch rather than 180ths.

The other change you might need to make is to the code that precedes graphics data: 24-pin printers expect the code sequence 27, ASC"*", c MOD 256, c DIV 256, where c is the number of columns of graphics data you are just about to send.

Note that for 8-pin dumps each column consists of a single byte, whereas 24-pin dumps require exactly three bytes per column. This code is sent from line 1710 onwards.

Random numbers (or rather, pseudo-random numbers) are generated in the 'standard' way by rotating a 32-bit value and sometimes EORing that value with a specially chosen constant. The theory behind this process is rather too involved to go into here, so I'll just wish you happy dumping!

£15 SMOOTH OPERATIONS



Shadow screen used for smoother sprites

Listing 2 is from Agora regular Simon Pettitt and earns him £15. Combining previous ideas that have appeared in Agora, Simon has produced some very smooth sprite-plotting.

It is often useful to be able to preserve what's 'behind' a sprite, and we have seen examples of how this is done using the sprite command *SGET (to grab an area of the screen 'into' a sprite). This technique is particularly effective when used in conjunction with 'screen swapping' in which two screens are used – one for update and one for display. Make sure you have at least 80k of screen memory configured on your machine and about 64k of sprite memory before trying out Simon's program.

Listing 2 employs two Osbyte calls – 112 and 113 – to select which of the two screens is being shown and which is being updated.

The plot code &ED is used both to display the sprite being moved and to restore the two background pictures.

£5 ROUND NUMBERS

To keep the speed-freaks happy, here's the latest offering from David Lawrence – some super-fast mode 13 circles. Listing 3 begins by plotting 1000 circles at random using the Basic CIRCLE command. The time taken to do this is shown. Press a key and another 1000 circles will be displayed – this time using Dave's ARM-code routine. The speed-improvement is impressive!

The algorithm Dave uses dates from 1977 and was originally developed by J E Bresenham. Essentially it works by first reducing the problems to one-eighth. That is, one-eighth of the circle is plotted and the rest of the outline is then produced by reflecting this first eighth in various ways. This routine is performed by listing 3 in the yellow pages using FNplot eight times.

Having reduced the problem in this way, the task is now further simplified to one choice – which is whether to plot the next point to the right of the current one, or down and to the right.

The mathematics of this decision have been simplified to the arithmetic used by listing 3.

Interested readers might like to refer to Bresenham's original paper, 'A linear algorithm for the incremental digital display of circular arcs' from the well-known publication 'Communications of the ACM 20(2)'.

Send your programs, ideas, tints and hips to: Arc Agora, BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Items published can earn their authors up to £20.*



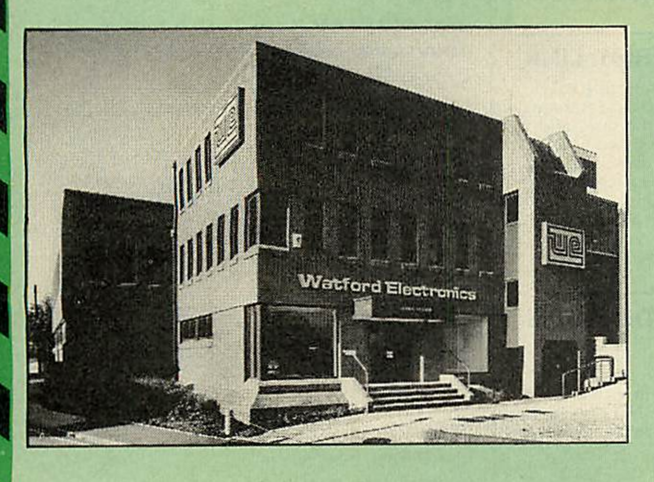
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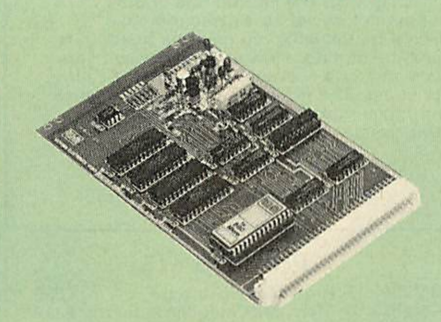
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SPECIFICATION

SOFTWARE

All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:

- Grabbing of images to the screen or dumping to memory.
- Continuous grabbing and display for previewing or camera alignment.
- 'Hot key' grabbing – pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
- Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
- Rotation and scaling to any angle and size, rotating about any point, with optional window clip, and logical (AND/OR/XOR) plotting.
- Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers – pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
- Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
- Smoothing and noise spot removal to enhance image quality.
- Creation of sprites from all or part of a digitised image.
- Saving and loading of digitised images in compressed format.
- Combination of pictures by adding, avaraging, subtracting, multiplication etc.
- Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.

Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK

A disk is included, containing sample pictures, examples and utility programs including the following:

- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied).

Cont.

SPEED

Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

Automatic video level control and black level clamping circuitry is used to ensure that the optimum contrast is obtained from a variety of video sources. A filter is included to avoid patterning effects when using colour sources.

Price £249

Watford Dealers' List

UNITED KINGDOM

Alpha Microtec Ltd, 321 Stratford Road, Shirley, Solihull, West Midlands. Tel: 021-745 8998.

Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

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HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Pasture Lane Farm, Pasture Lane, Rainford, St. Helens, Merseyside WA11 8PU. Tel: 074488 3667.

The Computer Depot, 205 Buchanan Street, Glasgow G1 2JZ. Tel: 041-332 3944.

Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

OVERSEAS DEALERS

*Absolute Electronics, Rewal House, 208-210 La Trobe Street, Melbourne, 3000, Victoria, Australia. Tel: (03) 663 2411.

Computer Distribution Company, Parklaan, 47, 8-9300 Aaist, Belgium.

E.B.N., Elisenstrasse 13, 1000 Berlin 41. Tel: (030) 7952057.

Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Lindis International Ltd, Wood Farm, Linstead Magna, Halesworth, Suffolk. Tel: 098 685 476.

Scientex P.V.B.A., Zilversmidstraat 2, B-2000 Antwerpen, Belgium, Tel: 03 233 59 06.

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark.

*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

Viking Tecno, Vestergade 12.1, 9620 Aalestrup, Denmark, Tel: 08 642522.

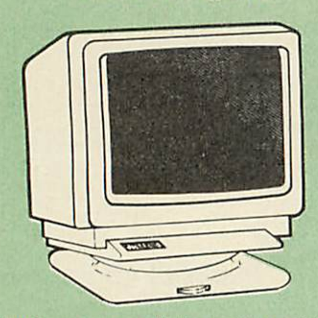
*Acorn/Watford Referral Centres.

Watford Electronics are Appointed & Authorised DEALERS / REPAIR CENTRE for Acorn Computers Ltd Cambridge Computers Ltd Microvitec Monitors Panasonic Printers

Continued



MONITORS & SWIVEL BASES



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

- 1431 – Standard resolution as used on the BBC television computer programme £175
- 1451 – Medium resolution, suitable for word processing in mode 0 £219
- 1441 – High res, exceeds the capabilities of the BBC micro £359
- 1431AP RGB + PAL and AUDIO £199
- 1451AP RGB + PAL and AUDIO £255
- 2030 CS 20" Med Res £380
- 2040 CS 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen £239**

TAXAN 14"

- **TAXAN Super Vision 2 Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing £263

14" MULTISCAN COLOUR

- TAXAN Multisync 770 Plus £449
- EIZO Flexscan 80605 – For technical info. read the review in Micro User, Jan. '89 £459
- NEC JC-1402P – Multisync II £459

NEW

Aries 1458 14" Multisync

Aries 1458 is a state of the art, stylishly finished, flat screen, Enhanced Multiscan Colour Monitor. An auto-switching device changes modes without having to adjust the monitor (it also works in monochrome). Its wide frequency range (15-45KHz) and multi-colour display allows increased options and flexibility. 0.31mm dot pitch. Input Signal: TTL/Analogue, H-Sync 15-45KHz; V-Sync 47-100Hz; Bandwidth 35MHz; Resolution 800 x 600 Hi-resolution Multi colour Display; Display Colours CGA-16, Mono-Green (3 levels), EGA 64, Analogue – limited only by the video display adaptor; Built-in tilt and swivel base.

Launch offer **£379**

NEW

SPECIAL OFFER

AMBER MONITOR

BT MERLIN/Acorn 12" Hi resolution Amber monitor. Ideal for wordprocessing. Consealed front panel mounted controls. Illuminated mains on/off rocker switch. Supplied complete with BBC Cable.

Only £49
(Offer valid while stocks last)

N.B. carriage on Monitors £7 (securicor)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

By placing your monitor on one of our professional swivel bases (see monitors drawing on the left), you gain the freedom to adjust the monitor viewing angle to suit your needs and thus alleviate eye strain and reduce back stress. The front mounted adjustable control dial makes adjusting the monitor viewing angle very simple.

for 12" Monitors **£7** (carr. £2.50)
for 14" Monitors **£10** (carr. £2.50)

PHILLIPS

- BM7502 12" Hi-res Green Monitor £65
- CM8833 14" Med. Res Colour Monitor £219

STAR BUY

- **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. Has Composite Video Input. (Please state the type of Connecting Lead you require).

ONLY £199

Dust Cover for Phillips Monitors £6

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks.

£12

TAXAN KP-815 PRINTER

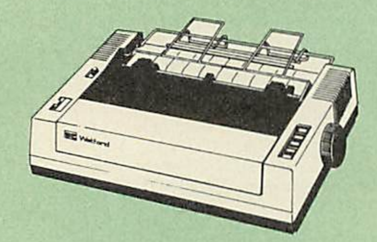
80 column, Bi-directional, 160 CPS, (NLQ 24cps); Friction & tractor feed + paper roll holder as standard; Epson FX compatible.

Offer Price £155

Taxan KP915 132 Column Printer
£275 (carr £7)

RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.

(Price inlcudes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£145** (carr. £6)
Optional RS232 Interface: £39

RS-232 GENDER CHANGERS

Male to Female	£4.95
Male to Male	£4.95
Female to Female	£4.95

Panasonic KX-P4450 LASER PRINTER

Latest technology at affordable price. Prints 11 pages a minute, Two A4 size paper bins, Serial & Parallel ports, 512K Buffer – expandable to 1.5Meg, 15 Character LCD Display, Diablo 630, Epson FX-286, IBM Proprinter, HP Laserjet emulations, 5K pages per month duty cycle.

ONLY £1,625

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

Price: **£269**

FREE Cut Sheet Feeder worth **£65** with every P2200 printer purchased from us this month)

Pinwriter Serial Interface	£55
Additional Font Cartridge	£25
NEC P2200 Pinwriter Ribbon	£6

NEC PINWRITER P6/P7 Plus

The Ultimate matrix Printer for Business.

24pin printhead; Print speed, 265cps Draft, 90cps LQ; Inbuilt Tractor & Friction feed; A paper park & low tear facility; 20 inbuilt FONTs; A font cartridge facility; 80K of Printer Buffer; Colour option available; P6 is 80 column & P7 is the wide 136 column.

P6 Plus 80 columns	£439	P7 Plus 136 columns	£575
Colour Option	£74	Serial Interface	£73
Cut Sheet Feeder	£125		

Star LC10 £175 LC10 Colour £225

EPSON PRINTERS

EX800	£405	LQ850	£430
EX1000	£545	LQ1050	£589
FX850	£315	LQ2500+	£839
FX1000	£425	LX800	£175
GQ3500 Laser	£1249	SQ2500	£975
LQ500	£285		

PLOTTERS

Hitachi 672 Colour Plotter	£475
Plotmate Plotter A4S	£379
Plotmate Plotter A3M	£549

CUT SHEET FEEDERS for

EX800 **£149**; EX1000/LQ2550 **£210**; FX800 **£149**; FX1000 **£179**; LQ/LX800 **£139**; LQ500 **£75**; LQ850 **£135**; LQ1050 **£175**.

TRACTOR FEED for

EX800/1000 **£85**; LQ800 **£44**; LQ850 **£69**; LQ1050 **£85**; LQ2500 **£195**

ACCESSORIES

- EX800/1000 Colour Option £55
- EX800/1000 Colour Ribbon £18
- LQ2500 Colour Option £65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

Universal Printer Sharers/Changers

Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

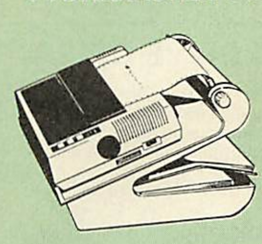
Connects	Serial	Centronics
2 to 1	£22	£23
3 to 1	£30	£32
5 to 1	£40	£42

(Cables extra at £6 each. Please specify type required when ordering)

INTEGREX COLOUR JET PRINTER

- Colour Jet 132 Printer **£515**
- Paper Roll **£6**
- Screen Dump Software **£10**
- Colour Cartridge **£14**
- Black Cartridge **£8**
- 100 A4 OHP transparencies **£55**
- 8K Serial Interface Optional **£99**

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £2.50)*
***132 Column version £26** (carr. £2.50)*

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 meter	£7
IBM Parallel Lead 1 meter	£7
Double Ended 36 way Centronic Lead	£9
RS232 Leads (Various)	P.O.A.

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
Brother HR15/20	£3.00	£5.00
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	£4.95
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

- *1,000 Sheets 9½" x 11" Fanfold Paper* ***£7***
- *2,000 Sheets 9½" x 11" Fanfold Paper* ***£12***
- *1000 Sheets 9½" x 11" NCR 2 Part Fanfold* ***£19***
- *1,000 Sheets 15" x 11" Fanfold Paper* ***£9***
- *1000 Sheets true A4 Fanfold Paper* ***£11***
- *2000 Sheets true A4 Fanfold Paper* ***£19***
- *Teleprinter Roll (Econo paper)* ***£4***

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

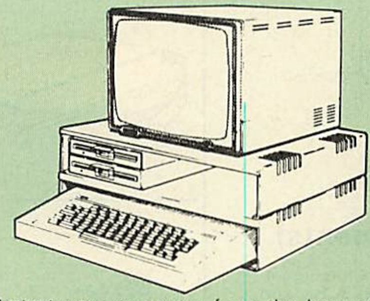
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	***£5.00***
1,000 90 × 36mm (Twin Row)	***£4.90***
1,000 90 × 49mm (Twin Row)	***£7.50***
1,000 102 × 36mm (Twin Row)	***£6.25***

Carriage on 1,000 Labels £1.00

PLINTHS FOR BBC MICRO, MASTER & PRINTERS

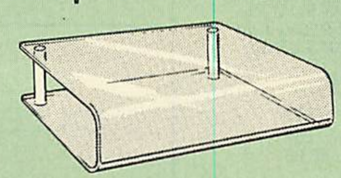


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	**£12** (carr. £2)
Double BBc Plinth	**£20** (carr. £3)
Printer Plinth	**£12** (carr. £2)
Single Master Plinth	**£13** (carr £2)
Double Master Plinth	**£24** (carr £3)

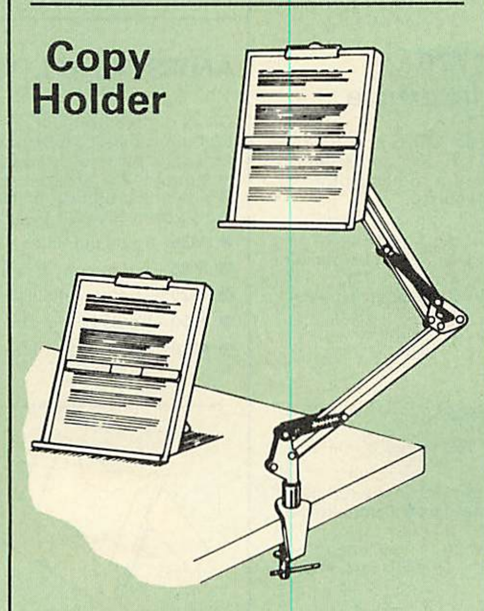
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£119**

BBC Screen Dump	**£10**
Colour Ribbon	**£6**
Black Ribbon	**£6**

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

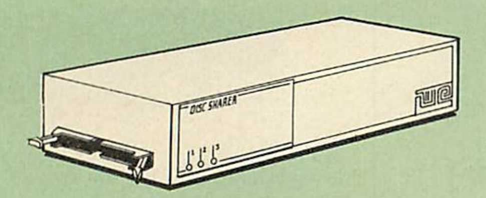
£5.95 (No VAT)



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£59**
- *Acorn's 0.90 DFS Kit complete* **£59**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

NEW

Watford's MkII 1770 Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

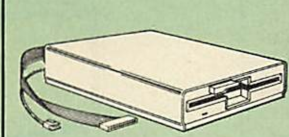
- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- **CLS35 400K Unit** **£69**
- **CLD35 800K Unit** **£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£4

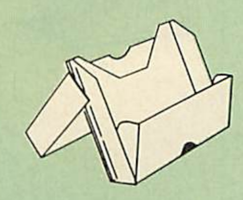
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£5.00**
- **M85** – holds upto 95 5¼" discs **£8.00**
- **M25*** – holds upto 25 3½" Discs **£5.50**
- **M50** – holds 50 3½" Discs **£7.50**
- **M10** – holds upto 10 Data Cartridges **£15**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

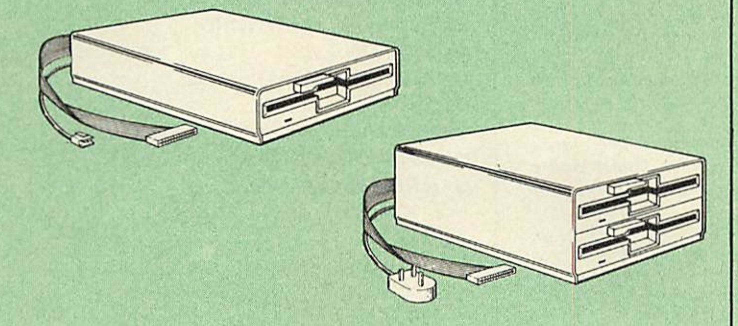
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 5th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £82	CLD 400 £168	CS 400S £92	CD400 £188
800K (1.44M)		CLD 800S £162		CD 800S £182

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

Prefix ***C*** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix ***S*** *= 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes (744)* ***£6.00***
- *10 × 5¼" D/S D/D 40 Track Diskettes (745)* ***£7.00***
- *10 × 5¼" S/S D/D 80 Track Diskettes (746)* ***£11.50***
- *10 × 5¼" D/S D/D 80 Track Diskettes (747)* ***£11.00***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£16***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£10.00***
- *10 × 3½" D/S D/D 40/80 track Discs* ***£11.75***
- *10 × 3½" High Density Diskettes* ***£25***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- 10 × **M3** 3½" D/S D/D 80 Track Discs £11
- 10 × **M9** 3½" Double Side High Density £25
- 10 × **M4** 5¼" S/S D/D 40 Track Discs £5
- 10 × **M5** 5¼" D/S D/D 40 Track Discs £7
- 10 × **M7** 5¼" D/S D/D 80 Track Discs £9
- **10 × M8 5¼" D/S H/D Hi-Density Discs £14**
- 3" Double Sided Discs £2.50 each

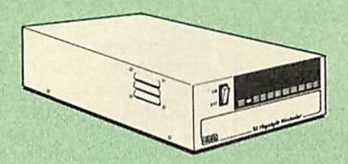
PRICES SLASHED

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

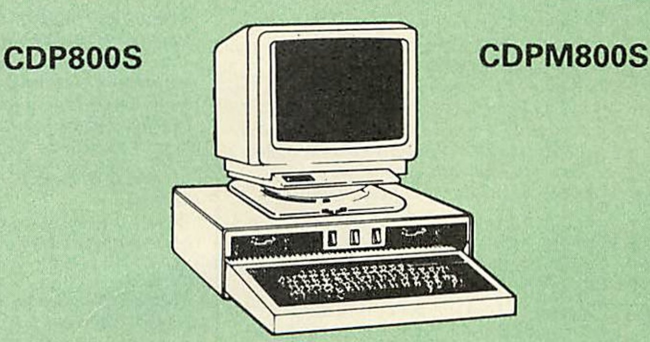


WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.
Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!
Compatible with the Master, and the BBc B (with 17 X disc interface).

● 10 Megabyte **£350;** ● 30 Megabyte **£420**

CDP800S **CDPM800S**

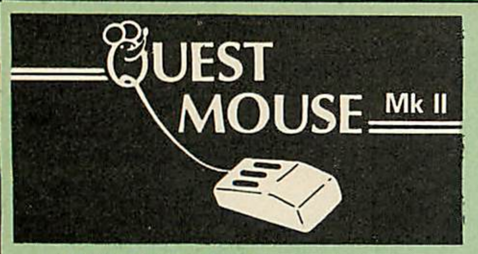


Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192
CDPM 800S for Master £196
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 9 of our advert)
(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

Continued





QUEST MOUSE MkII

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..."

FREE
our popular Colour Art software pack worth £15 with every Quest Mouse II & Quest Paint purchased this month.

". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87
"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."
". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".
"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".
"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".
"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".
"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".
"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."
"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".
"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:
"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Col. C.G. Holton, HQ 1 (BR) Corps, BFPO 39, writes:
"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:
"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

QUEST MOUSE II & QUEST PAINT	**£49**
QUEST MOUSE II, QUEST PAINT, AMX STOP PRESS & PAGEFONT	**£82**
QUEST MOUSE II ONLY	**£25**
QUEST PAINT SOFTWARE	**£32**
QUEST FONT DISC	**£12**
ConQuest 32K ROM Package	**£29**
QUEST MAT	**£3**
Part-exchange your old Mouse for a New QUEST MOUSE II for only	**£23**
GXR ROM for BBC Micro	**£22**

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21
(Price includes FREE software Disc and Operating Manual)

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

THE NEW Mk III AMX MOUSE

ONLY: £59 Inc. Super Art package
(carr £1.50)
(Please specify for BBC, Master or Compact)

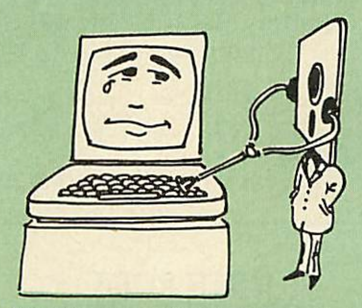
FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£12
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

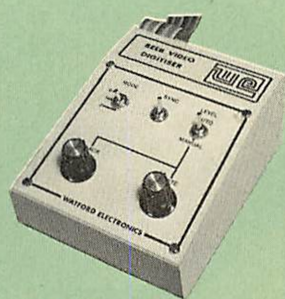
DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

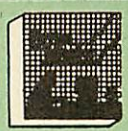
Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

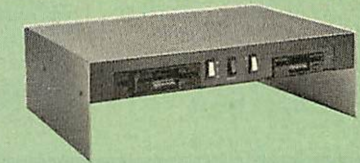
DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Continued





ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

● Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price: Aries B-12 **£40**
Aries B-12C **£5**



ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

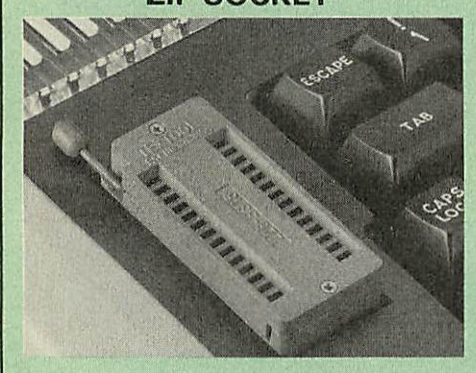
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

● Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

● The low profile of the socket allows unrestricted access to the Keyboard.

● All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

● This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

● BBC, B+ and Master compatible.

ONLY **£16** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

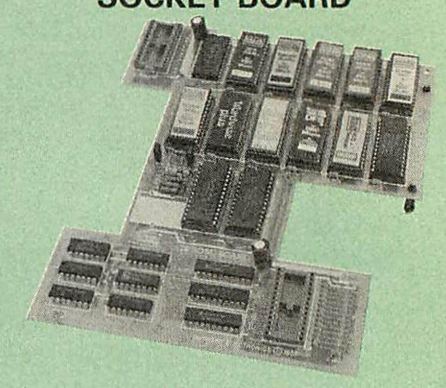
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- Supplied complete with Battery Backup.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

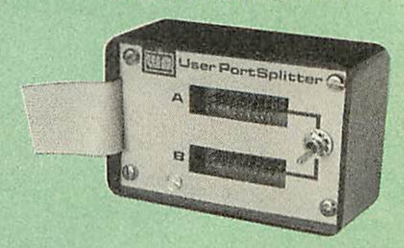
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
Battery Backup only **£3**
(carriage £2)

● Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

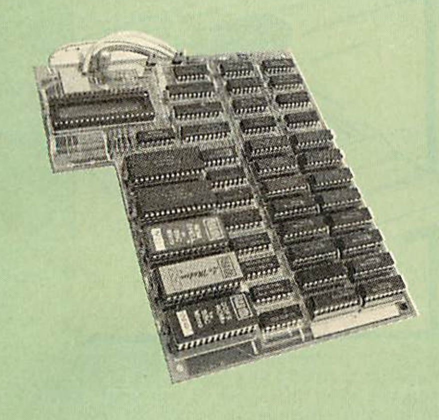
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM *£48*
- ROM/RAM card with 64k dynamic RAM *£65*
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £17
- 16k Dynamic RAM for Upgrade £17.50
- Battery backup £3
- Read and Write protect switches ...... £2 each

Complete ROM-RAM board
All options installed £115

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£75***
(carr £3)



(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

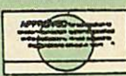
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£82** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.
Only **£10** (£2 carr.)

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued



COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
HI-VIEW (for 6502 2nd Processor)	£36
VIEWSHEET (Acornsoft)	£36
VIEWSTORE	£36
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£20
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2	£69

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
ROM Version	£43.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30

EPSON NLQ ROM
for the BBC Micro

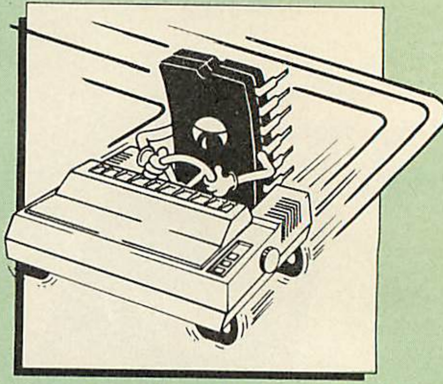
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: **£25**

VIEW PRINTER DRIVER for NLQ ROM £7

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

ROM-SPELL

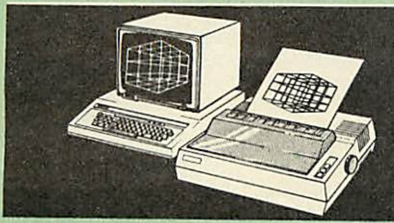


Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

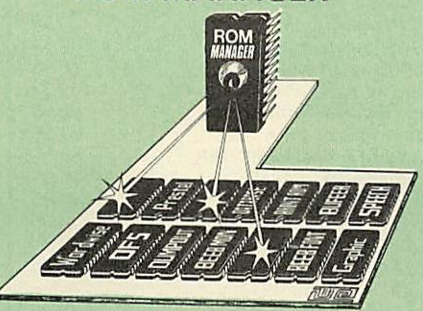
For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £11.25
- Maths with a Story 2 (Disc) 4 further maths programs £11.25
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs £17
- WAVES: Science Topics (Disc) CSC O Level Physics program. £14.95
- RELATIONSHIP: Science (Disc) O Level Biology program. £20.00
- BONDING: Science (Disc) O Level Chemistry program. £20.00
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. £20.00
- ELECTRONICS IN ACTION (Disc) O Level program £19.95
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. £20
- ECOLOGY (Disc) O Level program. £20
- POLYMERS (Disc) O Level program. £20
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20
- FOOD & POPULATION (Disc) O Level program. £20
- MICROTECHNOLOGY (Cassette) O Level program. £11.25
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. £21.70
- DEUTSCH DIREKT! (Disc & Audio Cassette) £19.95
- Modem Master (Disc) £11.25
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20
- Astronomy – Primary (Disc) £12
- Computers at Work – Primary £17.35
- Introducing Geography – Primary £17
- **Introducing Geography 11-17yrs £17.50**
- Electric Fields 6-14 years £11.25
- BlackQueen Contract Bridge £13
- Espana Viva – 3 Discs £19.95
- A Vous La France Disc £21.50

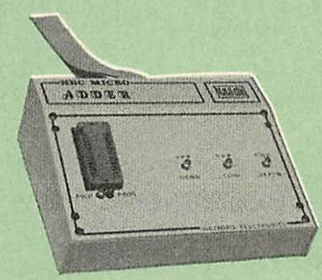
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

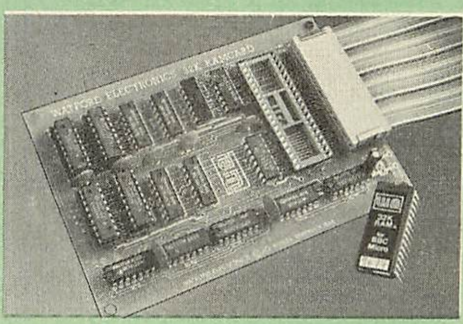
£75 (£3 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. £28 (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. £30 (carr £2)
- Spare UV tubes. £9

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.
- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)


Continued

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£9.95
6502 Assembly Language Program	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced Disc User Guide	£18.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
ARM Assembly Lang. Prog. Manua £12	
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£9.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2 – User Guide	£2
Basic ROM User Guide	£11.95
BBC – Advanced Graphics with the	£10.95
BBC – Advanced Programming Techniques for	£8.95
BBC – Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro – File Handling On	£7.95
BBC Micro Programs in BASIC	£5.95
BBC Micro ROM Book	£10.95
BBC Micro – within the	£13.95
BBC Master 128 for High Flyer	£10.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C - A Dabhand Guide to	£14.95
'C' Introducing	£9.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL – Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
Disc Drive Projects for Micros	£6.50
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH – Advanced	£9.95
FORTH – A Text Reference	£19.10
FORTH – Introduction to	£8.95
FORTH on the BBC Micro	£9.95
FORTH – Starting	£19.10
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Introduction to FORTH	£8.95
Introduction to LOGO	£6.95
Introduction to PASCAL	£17.95
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
LISP 2nd Edition	£15.95
LISP Looking At	£11.95
LISP on the BBC Micro	£7.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
LOGO – Introduction to	£6.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Master Reference Manual – Advanced	£19
Mathematical Prog. in BBC Basic	£7.95
Micro Prolog	£10.00
Microtext for the BBC	£10.00
Microtext Plus Manual	£9.95
Microtext User Guide	£5
PASCAL – Introduction to	£17.95
PASCAL Programming	£9.45
Pick Operating Sys. Practical Guide	£14.95
Practical Disc File Techniques	£5.95
Structured Basic	£7.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Towers Int. Transistor Selectors	£14.95
Understanding Interword – A Beginners Guide	£6.50
Using DOS+ on the 1512 (95% Ok for 512 Bd)	£9.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Wordprocessing On The BBC Micro	£6.25
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£10.95
Z80 Applications	£15.95
Z80 Assembly Language Prog.	£20.95
Z80 Programming the	£19.95
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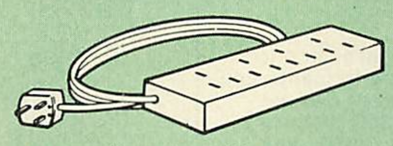
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Continued 

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NEW

Aries 1200 MODEM



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- Operates in V21 (300/300), V23 (1200/75 and 75/1200) and proprietary V23 1200 mode.
- Connect it to any type of computer or terminal via the 25 way serial D connector or the BBC standard 5 pin Domino socket.
- A built in phone socket means your phone plugs straight through.
- A reset switch so the hardware makes it easy to restart – even when your software doesn't.
- Industry standard Hayes (C) compatibility means that this is one of the easiest modems to use. It can automatically work out the speed your computer is working at, and even the speed and protocol of the modem at the other end.
- Auto Call mode can dial using tone or pulse (the modem works that out too), and when it connects it will automatically determine the speed of the answering modem.
- Auto answer mode means the modem can be left unattended to answer calls from other modems, and of course it automatically works out the speed and protocol of the calling modem.
- The built in speaker and front panel LED's mean that you always know what the modem is doing.

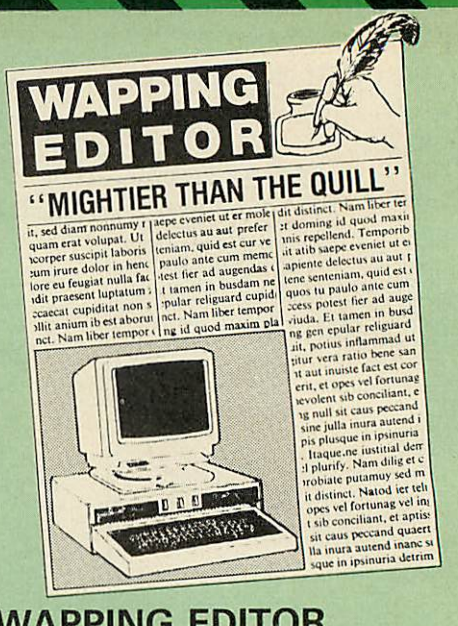
. . . Features at any price.

- Proprietary V23 mode mean that two Aries 1200's can communicate at 1200/1200 and in this situation you can take advantage of the built in data compaction which reduces the volume of text you send by 30%.
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- Internal watch-dog monitors the modems activity and in the event of a power failure or computer crash it automatically resets the modem. The Aries modem can never hold open your phone line or lock up your computer.
- Built in printer port allows the Aries to direct incoming data directly to a printer, text can be tagged so that it is selectively sent either to the printer or the computer.
- All modem setting are stored in solid state non volatile memory – no battery to go flat and hang crash the system.

Launch Offer **Only: £149**

Hayes Compatible BBC Comms Software ROM & Manual **£25**

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The WAPPING EDITOR

Watford Electronics bring professional quality Desktop Publishing to the Beeb. The Wapping Editor is a totally self contained mouse-driven desktop publishing package designed to run on the BBC B, B+ and Master computers. The massive 64K Rom contains ALL the software you need to do your own publishing. It 'Brings the Freedom of Press' to your fingertip. The software has a word processor, a graphics package, a page layout section and a font designer. Although very sophisticated, Wapping Editor is simplicity itself to use. Anyone already familiar with Quest Paint will immediately feel at home.

GRAPHICS PACKAGE

Imagine Quest Paint re-written to take advantage of the high resolution of Mode 0, well this is it. The Wapping Editor could well be worth buying for this facility alone. This must surely be the graphics.

WORD PROCESSOR

This section is a fully functional word processor specially tailored to suit the Desktop Publishing environment. Gone are all the unnecessary and cumbersome text formatting commands – these are dealt with in the 'Page-Layout' section. The features of this word processor include wordwrap, wordcount, insert/overwrite, move block, copy block, delete block, search and replace, browse, etc, many of these features being mouse controlled. Text input can of course be taken from existing word processor files like Wordwise, View, etc, but it is not necessary to have a separate word processor in order to use this package.

PAGE-LAYOUT SECTION

Page Layout becomes easy using these mouse-driven routines. The user simply 'pulls' a rectangle onto the page and states which text document or graphic is required to fill the space – it's as simple as that! Text can be automatically printed in a pre-set number of columns, left justified and/or right justified, or centered. Several different typefaces can be held in memory at one time. Graphics may be stretched, squahsed or cropped to fit any size rectangle. Graphics input can be from the software provided in the package or, using the 'mode convert', from any graphics mode screen.

THE FONT EDITOR

This is an enhanced version of the font editor contained in the Con-Quest ROM and allows the editing of ALL 95 characters. As well as being able to design your own typefaces, fonts from other DTP packages or from Quest Pain may be loaded into the editor and converted for use with the Wapping Editor. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Individual characters can be mirrored or copied and a mask feature allows you to superimpose two characters. Lines and columns can be inserted or deleted allowing the character to be stretched or squashed. This font editor will also allow 'font' and 'brush' files to be designed for use with Quest Paint.
This package is the latest in the line of integrated professional quality mouse-driven software from Watford Electronics, the company that adds power to Beeb.

Wapping Editor — Launch Offer: **£69**
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TAKING MEASURES

It's time we straightened out what the shortest distance between two points really is. Your BBC micro can help

Joe Telford

It sometimes takes an odd occurrence to remind you that you had intended to pursue a particular problem. So it was a few Sundays ago, as I was drowning in the local swimming pool, that a thought suddenly flashed across my mind: 'I intended to put an article together about maths and speed.'

My daughter and I had begun racing across the pool, and I was, of course, thoroughly beating her until she climbed out of the baths and ran round the side, jumping back in at the other end. She claimed a win, because as she said, 'First one to the other end of the pool wins.'

She moved five or six times faster on land than on water. The problem that immediately sprang to mind was: What length and width pool would make it more sensible to swim rather than run around the outside?

Shortest route

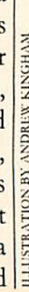
You are always taught that the shortest distance between two points is a straight line, and then a little later that the Great Circle route has a hand in it over larger distances. But it struck me that the shortest route might not always mean the shortest distances. There are lots of examples in industry where shortest route might mean cheapest or fastest, because time and money are more vital than the actual distance.

The easiest example to follow is shown in figure 1, where two points are shown on a tarmac area. The shortest and fastest route between them is a straight line from one to the other. In figure 2 the situation changes, because now we have two surfaces, say tarmac and water. The shortest distance (a straight line) might not be the fastest route. Look at figure 2 and sketch where you think the fastest route lies. One way to work it out is by trial and error, and in this context a computer is very handy. It's even more handy if you want a device to simulate testing of routes between surfaces, because this is an investigation which the computer can easily model.

The first question to ask is what shape does the shortest route covering two surfaces take, and how does this shape change as the surfaces and the start and the end points are altered? Look at figure 3. On any one surface we all know the shortest route is a straight line. So it's fair to assume that the shortest route overall must be made up of two straight lines which join at the 'frontier' between the two surfaces.

The difficulty comes in identifying where the joining point (C on the diagram) is; even more problems come from working out *why* the point is where it is. Suffice it to say that the position of C depends on the position of the start and end points (A) and (B), and also on the speeds attainable on each surface. For example, if the speeds are identical, then C is midway between A and B. As the speed on the second surface decreases, C moves away from A.

If you want to investigate such a phenomenon, then in pre-computer days you might try a range of activities for each situation: first drawing a diagram, labelling the points and areas. You could calculate times for various positions of C, and pick the shortest. These tasks are less useful than thinking about why the point ends up where it is, and they take up a disproportionate amount of time and



effort in calculation. The computer should reduce that calculation effort to a simple key-press, and a search for the lowest time value will serve to identify the shortest route in a few seconds. More time could be spent on developing a good strategy for searching for the best point, and thinking about why it is where it is.

Of course it is possible for the computer to give the shortest route automatically, but that only reflects on the programmer, not the user. You'll learn more from looking for signs of time intervals decreasing than from the computer telling you all the answers.

Using the program

The program in the yellow pages should be typed in or loaded from the *BBC Acorn User* monthly listings disc. If you type it, you should save it as "SSPEED". Then create a !BOOT file as follows:

```
>*BUILD !BOOT
0001 MODE 7
0002 CH. "SSPEED"
0003
ESCAPE
>*OPT 4,3
```

If you have a number of maths programs on a disc, then this program can be added. The version here does not create or use any datafiles.

If you have a Master, or a model B with shadow RAM, then you can use the program as it is. The lack of memory in a standard model B means a couple of changes need to be made. In lines 130 and 140 – when the 'ch' variable is 3 or 4 – the screen display mode must be changed to mode 4, not mode 1. And in line 640, the graphics plot mode must be set to GCOL4,3 instead of GCOL0,3. These changes make the most of the colours available in whichever screen mode you are using. On an Archimedes, no changes should be necessary.

When you boot the disc or CHAIN the program, it displays a title page. This page vanishes once you press Space, giving way to the main menu. The menu has seven choices available, accessed by pressing a letter key from A to G then pressing Return.

The first option, A, is to see the notes. This is done by pressing the letter A, then pressing Return. The screen clears and several pages of notes come up in succession. They explain the aim of the program; pressing Space moves you on to the next page of notes. When this is

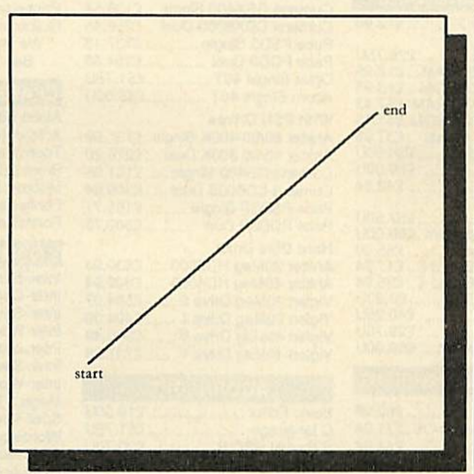


Figure 1. Two points, A and B, on one surface

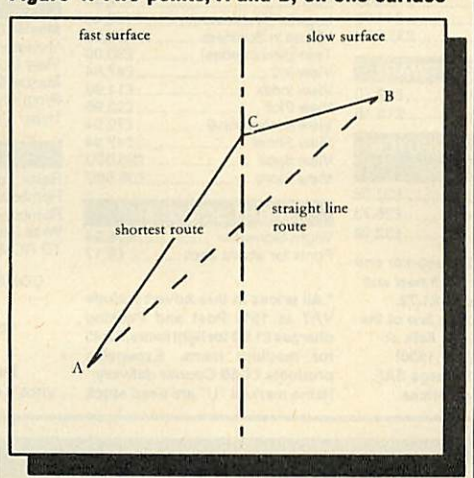


Figure 2. Two surfaces – tarmac and water

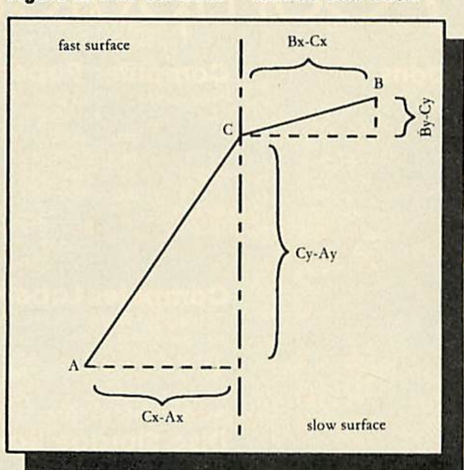


Figure 3. Measurements over two surfaces

finished the program returns to the main menu.

The next option is to Make new surfaces. This is done by typing 'B', then Return. The screen clears and displays the names of the two surfaces, with the speed linked to each surface.

You are asked 'Is this ok?' If you enter 'N' you are allowed to edit the names and speeds. Answering 'Y' returns you to the main menu.

The editing facility blanks out each name and speed in sequence. If you type a new value or name, then that is accepted, whereas if you simply press Return, the old value is reinstated. Surface names can have up to 10 letters, while surface speeds can be between one and 99 metres per second, in whole metres per second. One very useful idea for a classroom project might be to actually measure the speed of people running on grass, tarmac, sand, or swimming, cycling and so on. Then use these real values in the program.

The Move a point facility allows the start and end points to be moved in units of one metre. Pressing 'C' starts this process, and the screen changes to show the two surfaces in plan view, with start and end points in place. Holding down the Shift key and pressing the cursor keys moves one point; CTRL enables you to move the other point. Holding down Shift and CTRL moves both points together.

The scale of movement isn't shown, because each point can only move about five metres in any direction from its start point. It's also impossible for the points to leave their own surface. Once the points are in place, just press Escape and the points are fixed as you return to the main menu.

The Investigate option is the main part of the program. When you press 'D' from the main menu, the screen clears and the two surfaces appear with the two end points marked as crosses, along with a frontier point which is displayed as a circle. Six keys are operational now.

The up cursor key moves the circle upward along the frontier, until it reaches the top of the screen, and the down key, as you might expect, does the reverse. Both these keys move the point in one metre increments. In order to make finer movements, hold down the Shift key as you use the cursor keys – this moves the circle in 4cm increments. Because of the limited screen resolution, some key presses seem not to make a movement. This is quite normal, and the maths is still operational.

When you press 'C', it switches the distance-time measuring between recording each surface separately and combining the results. Combined results enable the shortest route to be found quickly, but there are occasions when the separate values for each surface will prove useful. The Return key tells the system that you think you have found the shortest route, and in response to this key the program

```
Surface-Speed: A mathematical investigation from Acorn User
-------------------------------------------------------------------------
Surface 1: Concrete Speed: 2 m/s
Surface 2: Grass    Speed: 1 m/s
-------------------------------------------------------------------------
          Start Point         Crossing point        End Point
          Coordinates          Coordinates         Coordinates         time
Run-------X---------Y---------X---------Y---------X---------Y---------secs
1        -10        0         0         5         10        11        17.25
2        -10        0         0         11        10        11        17.43
3        -10        0         0         8         10        11        16.84
4        -10        0         0         8         10        11        16.84
5        -10        0         0         7.88      10        11        16.84
-------------------------------------------------------------------------
```

Figure 4. Using different start and end point co-ordinates, find the shortest route between two points on two surfaces by trial and error

draws the shortest time route in comparison with the shortest distance route, then records the information found. The program then returns to the main menu. The Escape key also returns the program to the main menu, but without making a record of any information.

From the main menu press 'E' then Return. When no results have been recorded from the Investigate option, this just returns you to the main menu. Once results are in memory, they can be printed out. Following the instructions gives a print-out similar to figure 4. Notice that the co-ordinates shown are processed into a standard form, where the start point is always at a Y value of 0, and the crossing point always has an x value of 0.

This makes graph drawing easy, and transferring the co-ordinates to graph paper means that investigations can continue based on the scaled values.

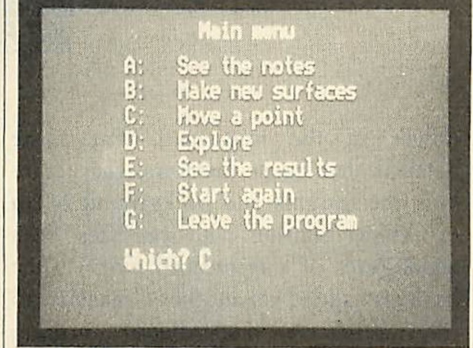
Further development

If you want to use this program with schoolchildren, a photocopiable record sheet could be made up to record routes and distances, and to measure distances and angles. Always remember that in any investigational work, there should always be room for activities away from the computer.

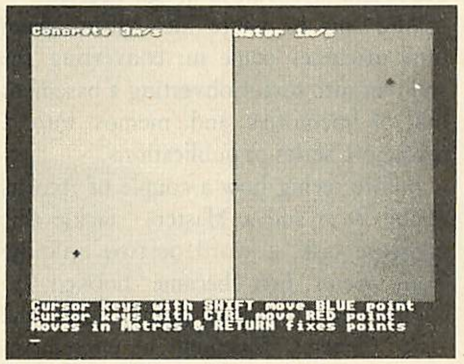
One of the reasons for developing the program in this way is to encourage the development of collaborative work of all sorts away from the computer.

It should be possible to use this program as a resource for a class of children working in groups to tackle surface-speed investigations.

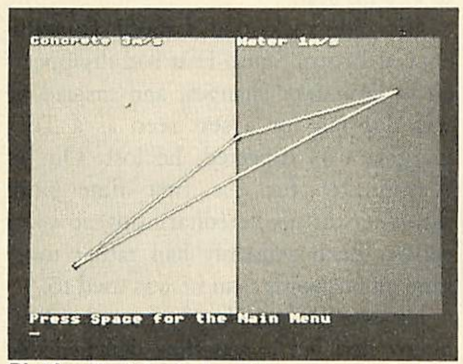
The last two options on the main menu include Reset or Restart – menu option F – and a Quit option, G. Option G has a safety lock which allows you to return to your program with any data intact, simply by pressing C to continue or Q to quit.



The main menu screen



Choosing points on either surface



Plotting the 'shortest path'

If you're working from tape in a classroom, you could get rid of option G by altering the INSTR statement early in the program. This prevents school students leaving the program too easily. Of course they can always use the Break key, but this can also be disabled on Master 128 and Compact machines, by turning the tiny screw inside the keyboard near Break.

So just what is the shortest route between two points? Well, try by starting with simple models, and alter one thing at a time, perhaps the start or the end point, find a few short notes and graph them. Now look at things like the y position of the crossing point in relation to the y-distance between the start and the end points, and possibly the ratio of surface speeds.

Different groups could repeat that activity for different surfaces, and develop a class surface-speed profile.

Very good students might try to define some formulae for predicting the shortest route, and this could of course be checked with the program. The investigation might be extended to look at the shortest route over three different surfaces or, going back to my swimming pool problem, the shortest route round or across different obstacles. Imagine you are a road builder, trying to connect town A to town B. However, a mountain lies in your path. Perhaps canal building could be used as an example – where vertical movement is much slower than horizontal travel.

Do you go round, through or over? Why would you go the way you have described?

Such problems are a long way from our simple computer model, but they are perfectly valid extensions in our world where education is starting to include more real-life experiences.

Joe acknowledges Mel Goldstein's part in bringing this problem to his attention.

THE BENN TAPES

BBC micros are helping to turn Tony Benn's archives – containing millions of words – into political memoirs

Bill Penfold

A little to the west of Notting Hill in London, there's a time machine that runs on a couple of Acorn computers. It works – and the other day it took me back almost 15 years to Bristol.

Shades of H G Wells or Doctor Who and the Tardis? Not exactly. More Shadow Cabinets, real Cabinets and the most intimate workings of politics over the past quarter of a century.

For the time machine is housed in the Holland Park home of one of the most colourful and contentious figures of post-war politics. A man who has single-handedly rewritten chunks of the country's unwritten constitution and provoked controversy throughout his career.

That career, often flying in the face of Fleet Street derision or the received wisdom of the Establishment, has prompted changes which in some way or other have affected all our lives. Now he says his own life has been transformed by the discovery of computing and wordprocessing. Which is maybe why he now owns a total of seven Beebs or Masters. Obviously not one to do things by halves, he is of course Tony Benn, former Labour Cabinet minister, Socialist visionary, reformer, would-be party leader, and politician extraordinaire.

Quite a description. But then, so much about Benn is extraordinary – as are the reactions he arouses, whether commendations or condemnations.

And his personal history has been pretty extraordinary too. Crammed with incidents, issues, events and campaigns capable of packing the lives of half a dozen other politicians. But unlike most politicians, Tony Benn is not content with mere memoirs, the usual self-indulgent or self-serving recollections, the 'setting the record straight' with partial recall.

Instead he has accumulated an astonishing personal database of diaries, notes, press cuttings, minutes and speeches over the years ... which have grown into what is now known as the Benn Archive. From this he is producing the Benn Diaries, a series of major books, which by the time they are completed should rank as probably the most comprehensive account of modern British politics to be produced by a single author.

Each diary is a quarter of a million words long, and each covers approximately a five-year period in the quarter-century since Harold Wilson first squeezed into power in the mid-1960s. Far more detailed than most memoirs, they combine the insights and background of an ex-Cabinet minister with the dates, facts and figures of a researched work. They have also added yet another dimension to the multi-faceted Tony Benn – turning him into a diarist who makes Samuel Pepys and Mrs Dale look half-hearted.

And this is where the Acorn-driven time machines come in: converting the archives into text. Converting a basement full of memories and memos into a mammoth series of publications.

Before seeing how a couple of Acorns – one Beeb and a Master – tackle this immense task, a word or two on how Tony Benn first became hooked on computers. It began shortly after the 1983 General Election, a contest in which Benn knew he was almost bound to lose his seat.

His old, rock-solid Labour constituency at Bristol South-East had disappeared in boundary changes, and instead he was fighting for a seat seen as a Tory marginal. As expected, he lost. Out of Westminster for the first time since throwing off his hereditary title 20 years earlier, Benn suddenly had rather more time on his hands than he was used to.

His son Joshua already owned a BBC micro, and felt it was time dad had one too. After all, hadn't dad once been Minister of Technology? 'If you don't learn the new technology now, you never will,' Joshua told him.

MPs who lose their seats with years of service behind them get a 'redundancy' or severance payment from Parliament, and Benn invested part of this in a Beeb. It was a great investment. He was introduced to a little Basic programming, but more important he discovered the wonders of wordprocessing and got to grips with *Wordwise*.

Until then an indifferent two-finger typist relying heavily on Tipp-Ex, he found the flexibility and potential of wordprocessing a revelation. Quite simply, he explains, 'it transformed my life!'

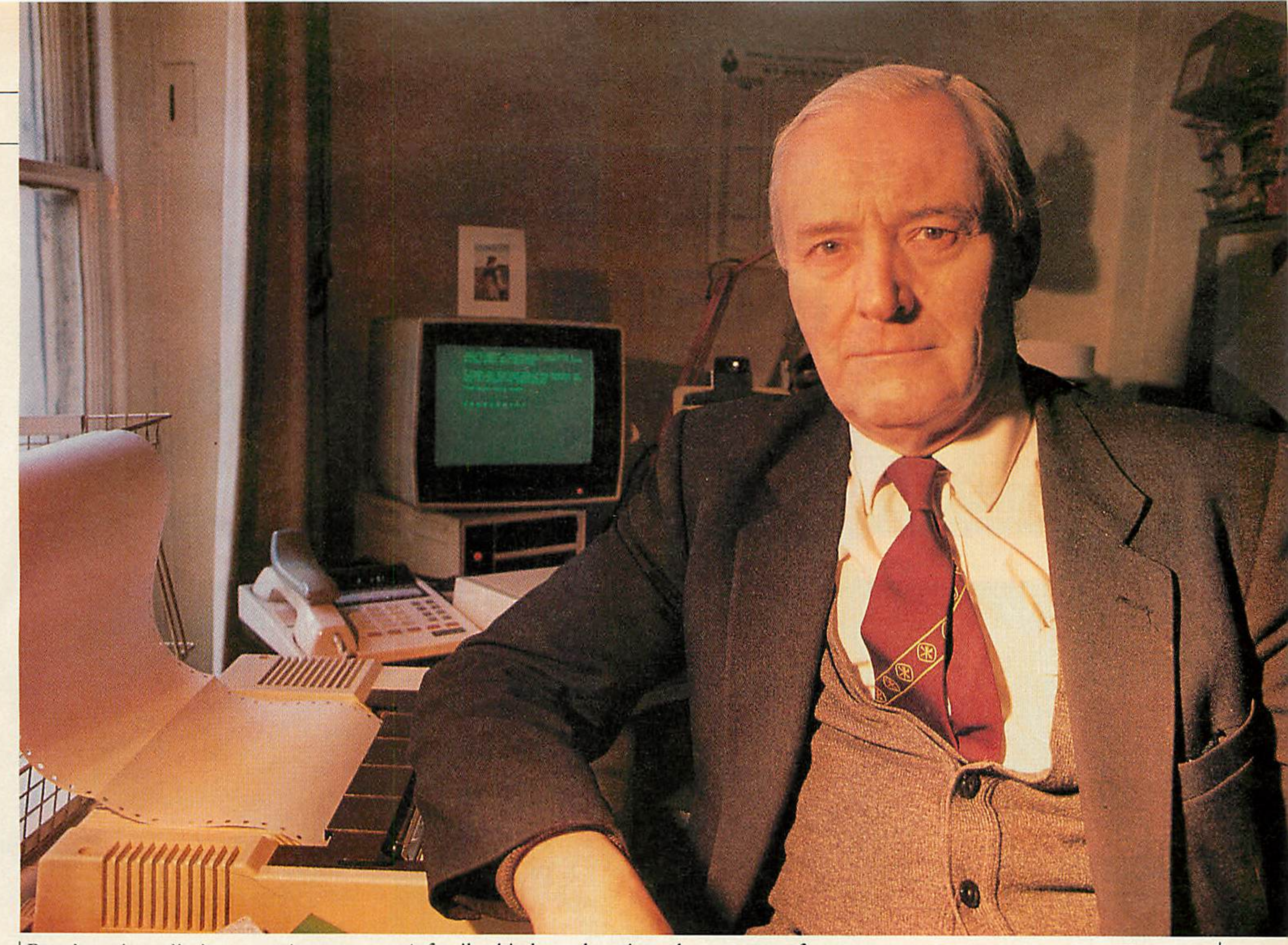
Two years later, in 1985, Benn was back at Westminster as MP for Chesterfield. But by then other Acorn computers began to trickle into the Benn household. There are currently four in the West London home, a fifth at their country cottage, another with daughter Sheila and the seventh at the home of the editor of the Benn Diaries, Ruth Winston.

Two machines are devoted entirely to the diaries, while another is hard at work in an adjoining room used by Benn's parliamentary secretary, Kathy Ludbrook. With a Master and *Wordwise Plus*, Kathy deals with the 10-15,000 letters a year which flood into the office. That's an average of 40 or 50 letters every day – her record is 83.

It's in the basement of the Benns' home that all this work is carried out. Packed, slightly cluttered, informal but efficient, it has already resulted in two of the heavyweight diaries, with the third due next autumn just in time for the Labour Party conference. The enormous project began after Benn realised that with the power and simplicity of *Wordwise*, his archives could be transposed into a highly detailed account of years of government and opposition.

For central to the archives are Tony

PHOTOGRAPH BY FLO SMITH



Benn's various diaries, some just notes or bedside scribblings. But most vital of all are daily recollections and observations stored on hundreds of cassettes which since 1966 he has habitually tape-recorded before going to bed. Originally these tapes were intended as just a way of putting each day into perspective, of focusing on events large and small. But over the years they have developed into much more, into an almost unparalleled account of recent political history.

In other words the archives became the raw material for a major political-historical account – an account stretching across the years from the old school Tory Party of Sir Alec Douglas-Home, through Harold Wilson's 'white heat of technological revolution', devaluation and defeat, on to Ted Heath, the three-day week, the return of Wilson and his replacement by Jim Callaghan, devolution and more defeat, and the start of the Thatcher era.

Benn succeeded in selling the idea to the Rowntree Trust, which provided the first funds for the massive task of wordprocessing the archives. With money from the trust, he recruited Ruth Winston in 1986. She began the major task of transcribing the hundreds of cassettes, stretching back two decades, into text. She started work sitting in the Benn family kitchen, learning the secrets of *Wordwise Plus* and transcribing the daily cassettes direct on to disc.

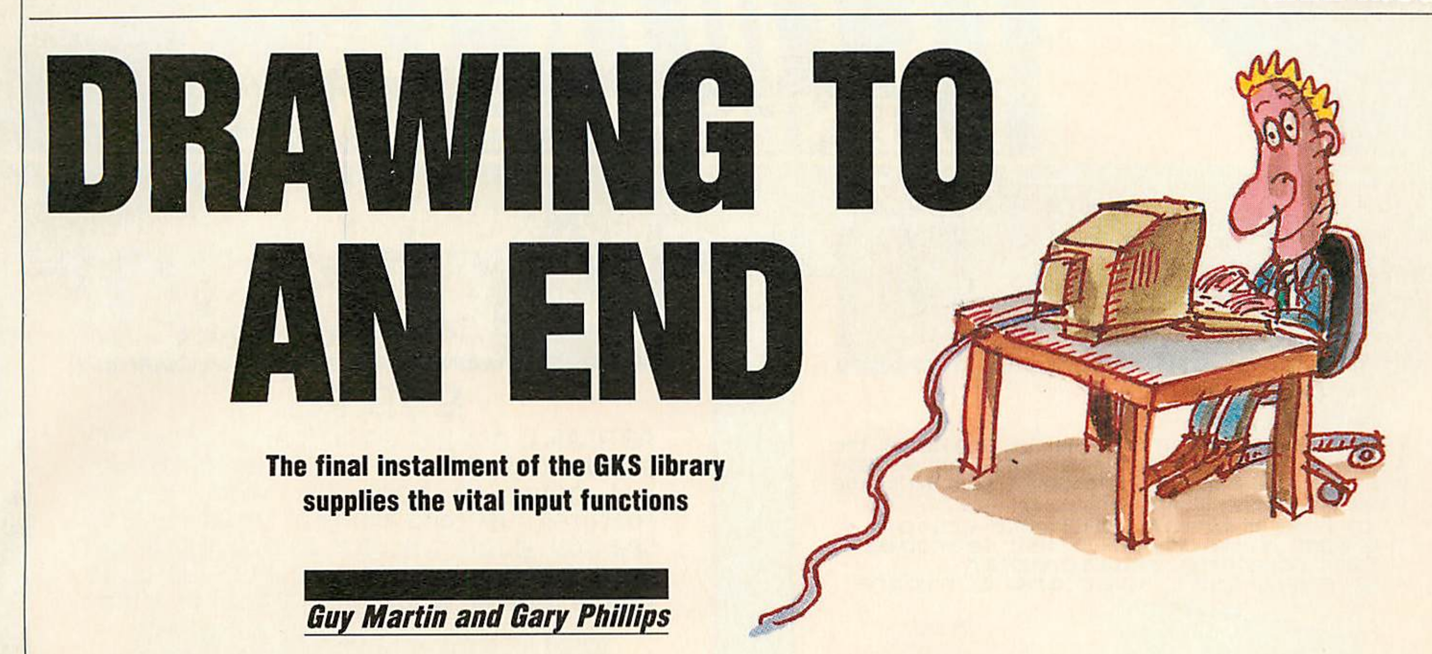
But it was a massive undertaking, and a Master was added to the project, along with another Ruth – Ruth Hobson. This time the wages were paid by an advance from the publishers, Hutchinson. Two years and 400 floppy discs later the two Ruths at last began to feel they have broken the back of the job. Another year or so and they believe they will have caught up and be working in 'real time' – transcribing the cassettes within days of their being dictated.

Their method of working is perfectly straightforward. Using headphones, they first simply type in whatever is said on the tape. Each book of quarter of a million words has been pruned from an estimated one and three quarter million – which requires some pretty ruthless editing. As the transcribing progresses, pages are printed out, enabling Ruth Winston and Benn to begin blue-pencilling whatever is unnecessary. 'We have to try to cut with integrity,' insists Benn. 'By that I mean that if it is clear I've made a mistake, then that has to be left in the book, but a lot of other detail is cut out.' It is at this stage, of course, that the power of wordprocessing comes to the fore. Armed with the edited print-outs, the two Ruths return to the computers to edit on screen and save the final manuscripts to disc.

The entire operation is effectively a time machine, a highly efficient means of transporting you back to a specific date, able to check out memories and facts. To try it out I recalled a Benn press conference I'd attended in Bristol during the crisis General Election of 1974, when the country was on a three-day week. Unable to recall the precise date, I remembered Benn saying he had received a telegram of support from Roy Jenkins. It was, at the time, an important political gesture. Turning to his 100-year diary, Benn found the Jenkins message had been sent on February 18 1974.

It was sandwiched between other major items of the times – the collapse of the TUC-Cabinet talks over the miners' strike, and the installation of a double sink at the Benn house. From there he was able to unearth the tape-recording of that very press conference all those years ago. Okay, so it wasn't exactly the Tardis, but I was impressed.

Once the diaries are completed the entire archives, including the discs, will be transferred to the British Library's new building at St Pancras, where shelf space is reserved. But Tony Benn will be keeping his Acorn computers.



DRAWING TO AN END

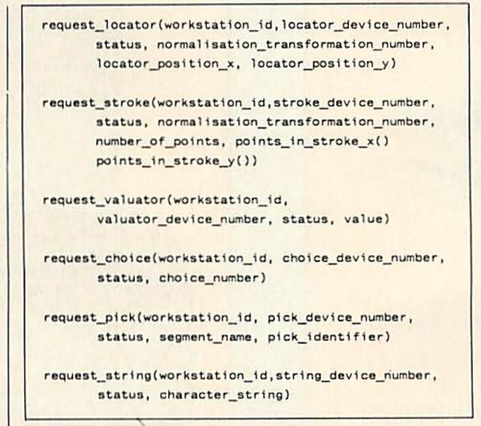
The final installment of the GKS library supplies the vital input functions

Guy Martin and Gary Phillips

The previous two articles in this series have shown you how to create and manipulate graphical objects referred to as segments. All the manipulation had to be pre-programmed into the application, and couldn't be altered as the program ran. But the GKS standard also includes various functions for input and interaction.

Take the example of the input required for a simple drawing program. This needs a series of co-ordinates that define a shape. In the standard Archimedes computer you get two input devices, the keyboard and the mouse, so the co-ordinates could be typed in at the keyboard, or read in from the mouse position. But whether the co-ordinates originate from the keyboard or the mouse is irrelevant to the application program – it simply requests some co-ordinates, and gets them back from somewhere. This is termed 'device independence', and can be likened to the different screen modes of the Archimedes all using the same 1280 by 1023 grid co-ordinates.

'Device independence' is vital in a portable, standard library, as programs running on different machines cannot be guaranteed to have all the same input devices. A minimal system may have only a keyboard, but GKS should try to use this keyboard to simulate all of the other 'logical devices'. The concept of 'device independence' and 'logical devices' can be understood better if you consider GKS as a graphical 'operating system'. An operating system is supposed to shield you from the hardware of the computer. In the same way, GKS is supposed to shield the program from the graphical hardware.



```
request_locator(workstation_id,locator_device_number,
       status, normalisation_transformation_number,
       locator_position_x, locator_position_y)

request_stroke(workstation_id,stroke_device_number,
       status, normalisation_transformation_number,
       number_of_points, points_in_stroke_x()
       points_in_stroke_y())

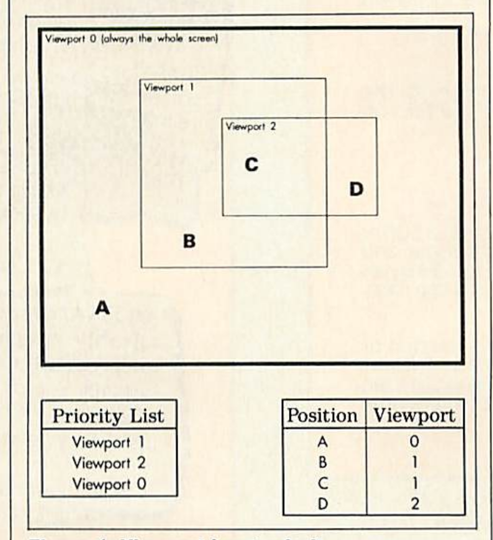
request_valuator(workstation_id,
       valuator_device_number, status, value)

request_choice(workstation_id, choice_device_number,
       status, choice_number)

request_pick(workstation_id, pick_device_number,
       status, segment_name, pick_identifier)

request_string(workstation_id,string_device_number,
       status, character_string)
```

Table 1. Input request functions



Priority List
Viewport 1
Viewport 2
Viewport 0

Position	Viewport
A	0
B	1
C	1
D	2

Figure 1. Viewport input priority

Applications require different kinds of input. For example, you may want to tell the application where to put something on the screen, give the application a sequence of co-ordinates, or give the application a value to work with. You could select from a number of options, select a segment, or even type in some text. Each of these types of input, belongs to a logical input. A locator inputs a position, an (x, y) value. A stroke inputs a sequence of positions, and a valuator inputs a value. A choice selects from a set of alternatives, pick chooses a displayed segment, and a string inputs a string of characters.

In this implementation of GKS, you are allowed access to the two main physical devices the Archimedes has, the mouse and the keyboard. Using only these two devices all of the logical input classes are simulated.

The simplest type of input is where the application has complete control. The program dictates when the input is to start, and waits for you to indicate that it is available. For example, it could ask you for a single co-ordinate pair, and wait until you indicate that they are available. This type of input is referred to as request mode. There are six GKS functions for request mode input, one for each of the logical input classes, as shown in Table 1.

When the request locator function is called, an indication of the locator position appears on the viewing device. You can then either change the position and accept it, or abort the operation. If the operation is aborted, the status returned will indicate this. Internally, GKS gets the position of the locator in physical device (screen) co-ordinates. The viewport that the co-ordinates refer to is then determined, and the normalisation transformation active for that viewport is then used to return the

ILLUSTRATION BY BENOÎT JACQUES

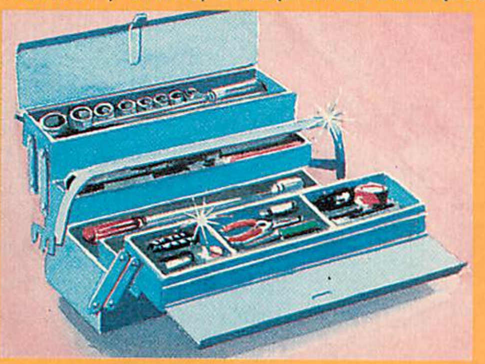


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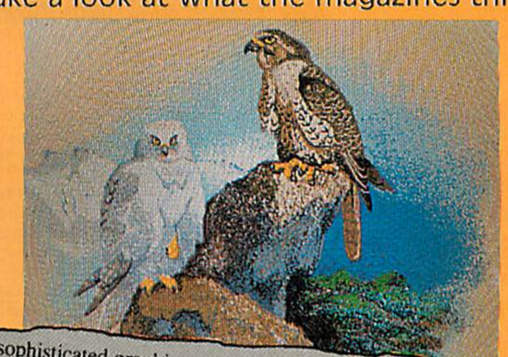
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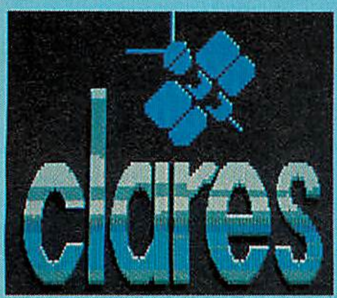
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locator position in world co-ordinates. The number of this normalisation transformation is also returned.

What happens if viewports overlap? In this case, the locator position could be in two or more viewports. GKS provides a facility to give viewports input priorities to overcome this. A list of the priorities of the viewports is maintained by GKS, so it can determine which viewport input refers to. By default, viewport zero is the highest priority: Figure 1 shows an example of this.

To obtain the priority list seen in the diagram, the following two calls would be used, assuming only zero plus two additional viewports are defined:

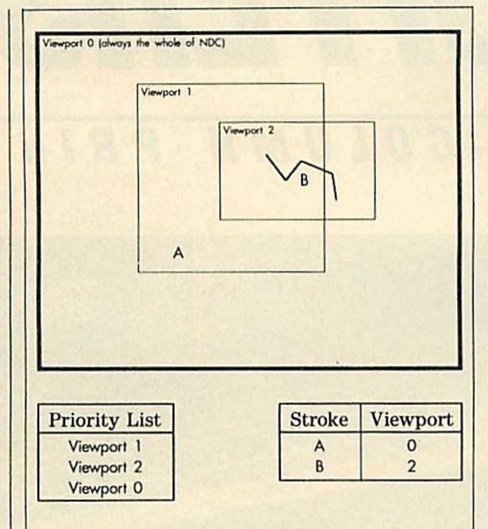
```
set_viewport_input_priority(1,0,HIGHER)
set_viewport_input_priority(2,1,LOWER)
```

The first means 'set the input priority of viewport one immediately higher than that of viewport zero'. The second call means 'set the input priority of viewport two immediately lower than that of viewport one'. This has the effect of ordering the priorities as one, two, zero.

The request_stroke function displays an indication of the current position, and you can then enter multiple points. These points are returned in the arrays points_in_stroke_x, and points_in_stroke_y It's very similar to multiple calls to request_locator. The number of points that you enter is also returned. The normalisation transformation number corresponds to the viewport that contains the whole of the stroke – if the stroke crossed viewport boundaries, then only the viewport containing the complete stroke is used. Figure 2 shows this: there will always be a part that contains the stroke because viewport zero spans the whole screen.

Request_valuator allows you to enter a value into the application. The number returned is real, and in a range specified by the application on setting up the valuator. The status returned to the program indicates whether you aborted or accepted the value returned. The next function, request_choice, allows you to select from a list of choices. The list of choices is set up on initialisation of the choice device.

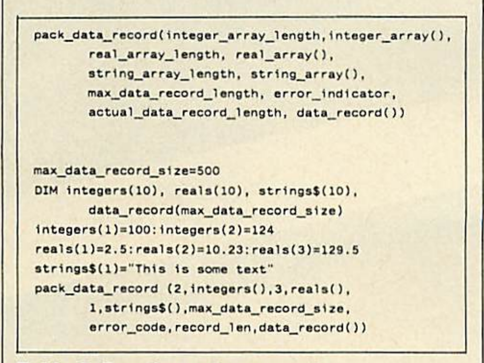
The request_pick function allows you to select a segment displayed on the viewing device. It returns a status indicating whether you aborted the operation, attempted to pick something that was not available for selection, or the pick succeeded. If the pick succeeded,



Priority List
Viewport 1
Viewport 2
Viewport 0

Stroke	Viewport
A	0
B	2

Figure 2. Stroke input priority



```
pack_data_record(integer_array_length,integer_array(),
        real_array_length, real_array(),
        string_array_length, string_array(),
        max_data_record_length, error_indicator,
        actual_data_record_length, data_record())


max_data_record_size=500
DIM integers(10), reals(10), strings$(10),
        data_record(max_data_record_size)
integers(1)=100:integers(2)=124
reals(1)=2.5:reals(2)=10.23:reals(3)=129.5
strings$(1)="This is some text"
pack_data_record (2,integers(),3,reals(),
        1,strings$(),max_data_record_size,
        error_code,record_len,data_record())
```

Table 2. Creating a data record

then the segment name is returned.

When creating segments using the drawing primitives, like polyline, a pick identifier may be inserted into the segment. Subsequent primitives are linked to that pick identifier until it is changed. When a segment is picked using request_pick, this is what is returned in the pick_identifier parameter. If a segment was created with no specified pick_identifier, the returned value is undefined. You include an identifier in a segment like this:

```
set_pick_identifier (number)
```

where number is the identifier required.

Request_string is used to enter a text string into the program. The parameters are the string device number, the status, and the resulting character string. The status indicates if you aborted the operation, or typed in the string.

Prompt and echo

Different applications have different requirements for interaction. In part these requirements are met by the multiple logical input devices. However, it may be that a programmer wants an input device to behave in different ways at different times. So there's a prompt to let a user know what sort of input is expected.

This is known as the 'prompt/echo type' of the logical input device. GKS provides for several prompt/echo types for each logical input device.

The prompt/echo type of a logical input device can be set by a call to an initialisation routine. Some prompt/echo types require various extra initialisation parameters. GKS specifies that these parameters are passed as a data record with contents dependent on the prompt/echo type. In Basic it works with two routines, pack and unpack. The only place where the unpack routine is used is within the initialisation routines.

The call is detailed in Table 2: if a routine required two integer parameters, three real parameters, and one string parameter, then the pseudo-code in the lower part of the table could be used. The input arrays (for integers, reals, and strings) are dimensioned for 10 values each. This means that a maximum of 10 parameters of each type may be packed into the data record. The output parameters are the error code, the actual record length, and the data record array. The error code returned is zero if no error occurred in packing the data. A special record, NULL_RECORD() is defined by GKS for situations where no additional parameters are required.

Device initialisation

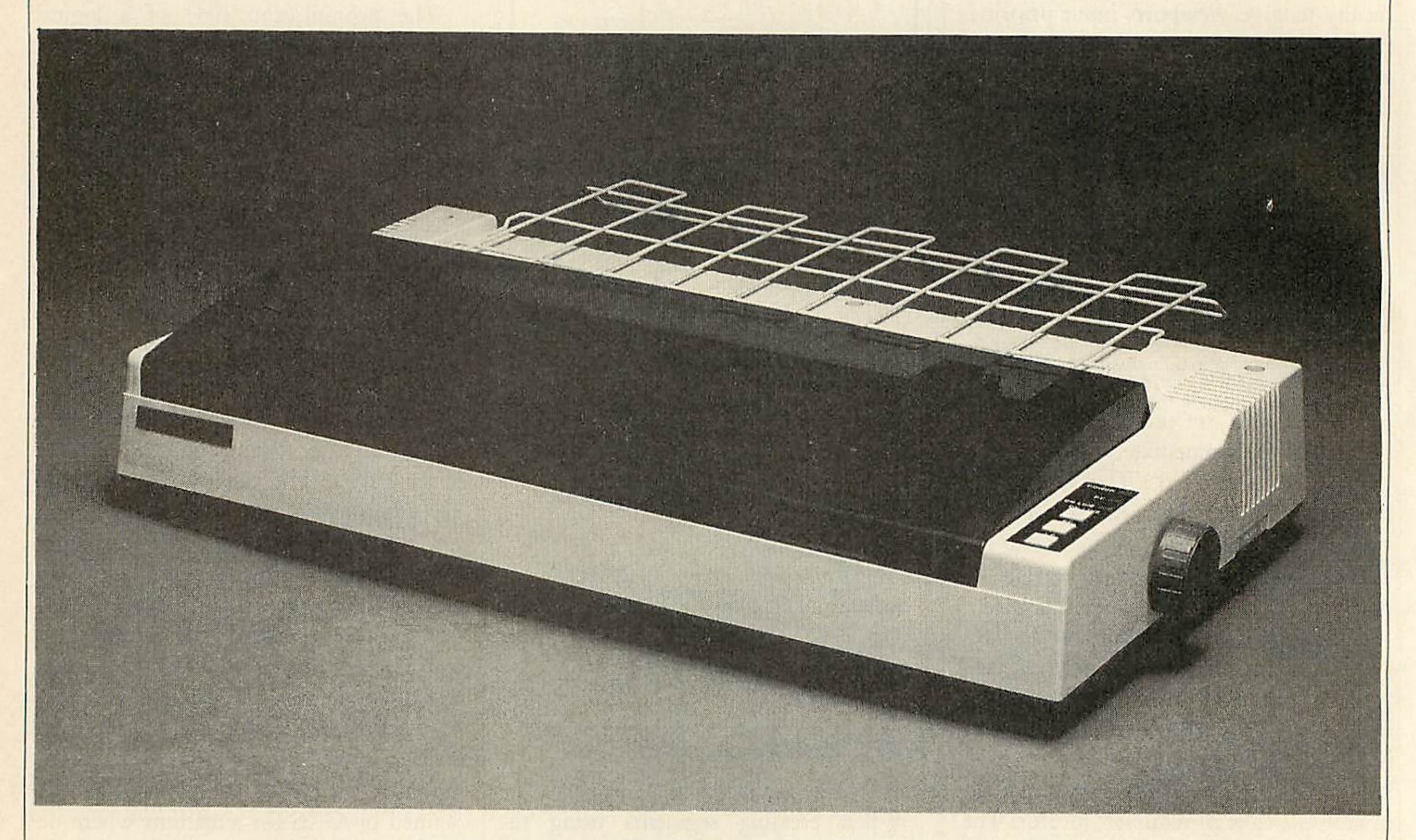
The functions that initialise the input devices are shown in Table 3. Note that all the routines have the parameters workstation_id, a device number and minimum and maximum x and y coordinates. The first two specify the workstation number, and a device number that is unique to the input class within the workstation. The echo parameters specify the echo area for the input device in physical device coordinates – zero to 1279 on the x-axis, and zero to 1023 on the y-axis.

Each initialisation routine takes a data record as an input parameter. This data record contains any additional parameters required by specific prompt/echo types.

The parameters for the initialise locator call set the initial position of the locator, in world co-ordinates, and an initial normalisation transformation for correct mapping of the locator position to device co-ordinates. The prompt/echo type takes one of six possible values – all the six standard types are implemented. These

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are STANDARD, CROSSHAIR, TRACKING_CROSS, RUBBER_BAND, RECTANGLE and DIGITS.

STANDARD shows the current locator position using the most efficient method – a small tracking cross is displayed at the locator position. CROSSHAIR shows the locator position as two intersecting lines across the whole screen. TRACKING CROSS is simply a small cross symbol, and RUBBER BAND allows you to move the locator, with a line linking the locator to its original position. Similarly RECTANGLE shows a rectangle whose diagonal is the line from the locator start to the current position. DIGITS displays the locator position, in device-dependent co-ordinates, in numerical form in the defined echo area.

To use the initialise_stroke routine, the parameters define an initial stroke in the world co-ordinates, an initial normalisation transformation, an echo area, a stroke buffer size and a position to begin replacing stroke points. All of the points up to the editing position remain unchanged in the output points. Changes occur from the editing position onwards. The prompt/echo type takes one of four possible values. STANDARD displays the current stroke using the most efficient method. DIGITS shows the current stroke position, in device-dependent co-ordinates, in digital form. MARKER displays a marker at each point of the current stroke. Finally, GLINE links each stroke point to the previous point by a line.

The parameters for initialise valuator define an initial value, an echo area and the highest and lowest values that may be input. The prompt/echo type takes one of three possible values. STANDARD displays the current value using the quickest method – the same as DIGITS. DIAL gives a graphical representation of the current valuator value, and DIGITS shows the current valuator in numerical form in the defined echo area.

The parameters for initialise choice define an initial choice status and choice number, a prompt/echo type and an echo area. The initial choice status may take the values OK, or NOCHOICE, and there is an initial choice number defined. If the initial choice status is OK and the user accepts without selecting a choice, then the initial choice is returned.

```
initialise_locator(workstation_id,locator_device_number,
      start_x, start_y,
      start_normalisation_transformation,
      prompt_echo_type,echo_x_min,
      echo_x_max, echo_y_min, echo_y_max,
      data_record())

initialise_stroke(workstation_id,stroke_device_number,
      number_of_points_in_initial_stroke,
      points_in_initial_stroke_x(),
      points_in_initial_stroke_y(),
      initial_norm'n_transformation_number,
      prompt_echo_type,echo_x_min,
      echo_x_max, echo_y_min, echo_y_max,
      stroke_buffer_length, editing_position,
      data_record())

initialise_valuator(workstation_id,valuator_device_num.,
      initial_value, prompt_echo_type,
      echo_x_min, echo_x_max, echo_y_min,
      echo_y_max, low_value, high_value,
      data_record())

initialise_choice(workstation_id,choice_device_number,
      initial_choice_status, initial_choice_number,
      prompt_echo_type,echo_x_min, echo_x_max,
      echo_y_min, echo_y_max, data_record())

initialise_pick(workstation_id,pick_device_number,
      initial_status, initial_segment,
      initial_pick_identifier, prompt_echo_type,
      echo_x_min, echo_x_max, echo_y_min,
      echo_y_max, data_record())

initialise_string(workstation_id,string_device_number,
      initial_string, prompt_echo_type,
      echo_x_min, echo_x_max, echo_y_min,
      echo_y_max, initial_cursor_position,
      data_record())
```

Table 3. Initialisation functions

```
get_locator(workstation_id,locator_device_number,
      normalisation_transformation_number,
      locator_position_x, locator_position_y)

set_locator_mode(workstation_id,locator_device_number,
      operationg_mode, echo_switch)
```

Table 4. Changing the input mode

The prompt/echo type takes one of five possible values, and the data record contains information associated with some prompt/echo types. STANDARD designates the current choice number in the same way as STRING_MENU. LAMPS causes prompting for a series of choices. The choices are selected using function keys, using the information supplied in the data record. The data record in this case is an array of integers, specifying which function keys are valid. Element n controls function key n, and should be set to the value GON for a valid key, or GOFF for an invalid key.

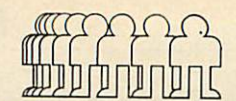
The STRING_MENU prompt/echo type causes the defined list of strings to be displayed in the echo area. The data record needs to contain an array of strings specifying the individual menu items. The user chooses one of the options by using the mouse. STRING_COMMANDS causes a list of the valid commands to be displayed in the echo areas as in STRING_MENU, but the user must enter the command required by using the keyboard. Finally, the SYMBOL_MENU type allows a single segment to define a set of symbols to appear in the echo area. The symbol segment name is passed as a single integer in the data record. Within that segment there must be pick identifiers corresponding to each of the choices available. The user can choose one of the symbols, and this function then returns a choice number that it obtains from the pick identifiers stored within the segment.

The parameters for the initialise pick routine are the initial status, initial segment, initial pick identifier, prompt/echo type, echo area and the data record. The initial status can be OK or NOPICK. If the initial status is OK and the user does not pick anything, then the initial segment and the initial pick identifier are returned. The prompt/echo type takes one of three possible values. STANDARD is the same as SEGMENT. SEGMENT highlights the whole of the segment containing the picked primitive. And PICK_IDENTIFIER_GROUP highlights any primitives in the picked segment that have the same pick identifier as the picked primitive.

The final initialisation function is initialise string. The parameters to this are the initial string, plus a cursor position, and the prompt/echo type. The initial string is the one that the routine returns if no string is entered. The initial cursor position is the one that the cursor is placed on in the initial string.

Sample mode

All the input routines described so far involve user interaction to 'confirm' the input – analogous to pressing the Return key. Sometimes you might want to get continuous position information – for example when dragging a segment across the screen. Therefore there is a function called get_locator. This works like request_locator, except no confirmation is required – it simply returns the current position of the locator, and the normalisation transformation number active there. Before you can use this call, the locator device must be put into sample mode. This is achieved by calling function set_locator_mode. The first two parameters describe the workstation number and the locator device number. The third parameter may be set to REQUEST, SAMPLE or EVENT – the EVENT mode of operation is not supported by this implementation of GKS. The echo_switch parameter specifies whether to echo the interaction with the locator_device or not, and may be set to ECHO or NOECHO.



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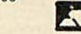
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ON SPEAKING TERMS

Many users find they can do one thing on one micro, yet they are unable to transfer their work to another. We show you how this may be overcome

David Atherton

Over the last few years, Acorn users have found it increasingly necessary for their computers to 'talk' to other varieties of incompatible machines. Often extra work has to be done on data originally prepared on other brands of micro. Also, you might have a Beeb at home and an IBM PC or clone at work. Many users in education, industry and commerce have, for one reason or another, acquired a whole range of micros which, while fulfilling various functions, are not directly compatible.

Recognising that many people have to work in this fashion, manufacturers have come up with a whole range of products which perform transfers and conversions of various types, or emulate one machine on another. As soon as you try to move data and programs between machines, you encounter a whole range of problems to do with different disc formats, screen colours and resolutions, and so on. A variety of techniques has been developed to obtain the best possible compromise. Some of these problems are solved for you if you buy the right piece of software, but there are other areas where doing the actual conversion or transfer is the only way to learn it.

IBM PC

Of all the microcomputers in the world, the great majority belong to one of about half a dozen variants. Of these, the most popular machine by far is the IBM PC – and its many clones and compatibles. For this reason, connectivity between IBM PCs and BBC machines is well implemented.

Because a PC's disc drives are broadly similar to those on the BBC, it is not usually necessary to use a serial cable; there are several ways to make either machine read the other's discs. Most IBM disc drives are 40-track, double-sided, double-density, and so to read them on a BBC, you must have a double-density controller – almost anything except the original 8271 disc interface. A B+, or a Master series micro is fine, or a model B fitted with a 1770-type disc interface.



Connectivity is a vital feature of the Z88

There are two main ways of reading IBM or MS-DOS discs on a BBC micro. One is to use *DOSCopy* by BakSoft, an excellent utility program which reads most variants of IBM discs. It will display a catalogue and transfer files both to and from a BBC disc. You can also delete and rename files, and *TYPE text files direct from the IBM disc. The program even formats IBM discs, which makes it ideal if you don't own an IBM but need to send a disc to someone who does. The program can be used with any type of BBC drive – of course you can only use single-sided IBM formats if your BBC drive is single-sided.

But either 40 or 80-track drives are catered for. IBM text files are slightly different from those on the BBC: they insist that a linefeed character (Ascii character 10) must follow each carriage return, and the program converts these if required. (Files created with *SPOOL on the BBC already have both carriage return and line-feed.) But this is the only data conversion feature on offer. Most wordprocessors on both machines will read plain text files transferred in this way, and as both machines use the Ascii code, you can be sure the text will be correct. *DOSCopy* works with Watford, Solidisk and Opus double-density interfaces, and of course the Acorn 1770 interface, standard in the B+ and Master Series. The other method is to use a full PC system such as the 512 board on the Master. Using its DOS Plus operating system, the Master 512 will read and write all PC formats as a matter of course. And there are utilities called Getfile, Putfile and Move which transfer files between BBC and PC discs, supplied with the system. The Move utility is only supplied with DOS 2.1, the latest version of the 512 operating system. A similar set of utilities exist in the Archimedes PC Emulator system, which is a software PC environment.

Briefly, the Master 512 is very fast, but only about 80 per cent IBM-compatitble because it uses Digital Research's DOS Plus, instead of Microsoft's MS-DOS. The Archimedes Emulator is about 99 per cent compatible, but not very fast – about half the speed of an Amstrad PC. Both, however, are good enough, and much cheaper and smaller than a real PC.

The IBM AT and its compatibles have a different disc drive, usually called a 1.2Mb drive (5.25-inch version) or 1.44Mb (3.5-inch). This is a quadruple-density device, and discs formatted in IBM AT format cannot be read by any BBC drive. No BBC controller can read this format. Users of the SJ Research MDFS Econet fileserver may like to try a bit of hacking, as this is the only quad-density control system in the BBC world.

Reading BBC discs on an IBM machine is less straightforward, as is exemplified by a PC product called *BeebDOS* from Boss Software. The standard PC disc controller cannot read single-density discs, and the drives are 40-track only. When you run *BeebDOS* on a standard PC, it will only read 40-track discs in a double-density format. The authors have tried hard, and *BeebDOS* supports a range of double-density DFS systems, plus ADFS, but only in 40-track of course – that is, ADFS small (S) format. Most double-density BBC discs are used in 80-track mode. This isn't really a problem, but it usually means that you have to prepare a special 40-track disc on your BBC micro before you can actually perform the transfer.

The program offers a comprehensive range of conversion utilities including *View* to *WordStar* and, even nicer, a graphics converter. You can design your own filters to convert other data. Other than using PC BBC Basic, this is the only way of performing these conversions.

Apple Macintosh

BBC connectivity is a fairly recent innovation in the Apple Macintosh world, and the leading company in this field is Human-Computer Interface. HCI has two programs which do just about everything necessary for transfer of information between the two machines. *View to Mac* runs at the Macintosh end, and will transfer files between *View* and *MacWrite* format. *MacWrite* is a standard text format on the Mac, which all wordprocessors and desktop publishing packages can read. The implementation is excellent, both in the method of transfer, and the quality of conversion. A recent upgrade now supports *InterWord* and *Wordwise* too: registered users can upgrade for £19.

It is impossible to read Mac discs in a 3.5-inch BBC drive, even though the discs are the same size. This is because the Mac drive uses a special formatting system called 'Group Coding' which is totally unlike the FM or MFM system used by most other machines. The disc has more sectors per track on the outer tracks, and the drive spins more slowly when accessing these. The only practical way to transfer data to a Macintosh is via a serial cable. After plugging in the cable, software like *View to Mac* asks you to type two *FX commands on the BBC to enable the serial link, and then takes over both machines. Files are transferred by selecting their names from a window, and then clicking the transfer button on the Mac screen with the pointer.

Data conversion can be done during transfer or afterwards, or not at all if you wish. *Screen to Mac* does the same job for a graphics screen. Any BBC screen (including mode 7) can be brought across, and Mac graphics can be taken to the BBC.

The programs are most useful in a school or publishing firm where desktop publishing is being done on a Mac, but material is prepared on the BBC micro. Text can be imported from *View* or *Wordwise,* and graphics generated with *SuperArt* or *QuestPaint.*

HCI is not committing itself to Archimedes versions of the programs at the moment, but there are other people doing work in this area.

Perhaps someone will transfer the beautiful libraries of Macintosh II 256-colour pictures over to the Arc!

Commodore Amiga

Commodore has just announced a full BBC micro emulator for the Amiga. It works at two levels – a 68000-based version of BBC Basic which it claims runs four to seven times as fast as the original, and a full 6502 processor emulation which unfortunately is much slower. This is a bit like the two levels of Archimedes emulation – Basic programs are much faster under Basic 5, but machine code programs running under the 65 Arthur emulator are not. Commodore's approach is clever in that it integrates the 65 Arthur-like emulator within the Basic, rather than having two separate packages. To transfer software, Commodore is recommending serial transfer, handled from within the package. But it claims a system to read BBC discs from an external Amiga drive will be available later. The emulator can read files from and write to AmigaDOS and run other Amiga tasks.

Atari ST

The Atari ST uses the same disc format as the IBM PC, and indeed *DOSCopy* caters specifically for Atari discs. Otherwise, serial transfer between the two machines is straightforward.

Formatted text can be moved between an Archimedes and an ST using the *First Word Plus* wordprocessor, which is available for both machines.

Both versions use a common file format and it is possible that *Timeworks* DTP on the Atari ST (and IBM PC) and the forthcoming Acorn *Desktop Publisher* for the Archimedes may well share a file format too.

Graphics may be transferred between the Atari ST or Amiga and BBC micros, subject to screen resolution and colour. But there's no commercial program which will do the job – it's a question of unravelling the bitmaps.

Cambridge Computer Z88

The Z88 is a unique portable whose operating system has many similarities with that of the BBC micro. Connectivity is a vital feature of the machine, and a serial transfer protocol, with full software handshaking, is built into the operating system. File transfer packages exist for the IBM PC, BBC, Macintosh and Amstrad PCW – all of them available from Cambridge Computer.

The built-in integrated software package, *Pipedream,* is almost identical in function, and absolutely identical in file format, to the packages of the same name on the Archimedes, PC and BBC micro (where it is known as *View Professional).* The *Pipedream* data format is well documented in the *Pipedream* manual, so it should be straightforward, once transferred to a BBC or Archimedes, to put the data into any other form.

Graphics are not really an issue with the Z88, as it only has an eight-line LCD display. Neither is disc reading – the Z88 doesn't have a disc drive.

CP/M Machines

The principal way to move data between CP/M and the BBC is by using the Acorn Z80 second processor. This comes with some transfer utilities and a version of BBC Basic. Other than plain text, it isn't so easy to move data, as very few conversion utilities are available. The simplest way to move formatted text and graphics is to use the various utilities which convert from CP/M to MS-DOS,

and then use a separate MS-DOS-to-BBC utility. Discs can be read, but unlike MS-DOS, CP/M disc formats vary between machines. Interestingly, the Master 512 can read some CP/M formats, allowing the data to be re-saved in DOS or BBC format. CP/M to BBC conversion is also carried out by several disc conversion specialists who cater for the rarer types of format. These are often, but not always, linked to typesetting businesses, as this trade has a large need for machine-to-machine connectivity.

Mainframes and minicomputers

Connecting to a mainframe or minicomputer generally involves using a serial link, and terminal software with varying degrees of intelligence. Direct formatted data and graphics are not normally even considered, as the file sizes and BBC's limited display capability usually make local handling of such data impractical.

Well-known terminal emulators include Acorn's Termulator, which gives VT52, Tectronix 4010 and limited VT1000 emulation, and Maya which adds Tandberg 2215 capability. These ROMs include file transfer software too, and Maya supports the oft-used Kermit protocol. As well as acting as a simple terminal, you can spool a complete mainframe session to disc, and make use of a local printer.

Other than this well-known use for the BBC micro, some more advanced connectivity is also possible. Many users of the Acorn 32016 second processor, and now the Arc, split their Fortran number-crunching work between their mainframe and BBC – the BBC being slower but always available.

I know of a commercial data processing programmer who writes in Cobol, and often tests routines using the CIS-Cobol supplied with the Acorn Z80 second processor when there is no access to the mainframe. The tested source files are later uploaded using standard terminal software. An interesting example was the development of Open Logo, the BBC/Open University version of the Logo language, which was actually assembled on a DEC-20 mainframe, before being ported as object code to the BBC micro.

Versions of BBC Basic

If you want to move your own programs from the BBC micro or Arc onto a range of other machines, then it's now quite

THE SERIAL CONNECTION

Virtually all modern micros have a serial or RS232 interface. As this is the only two-way interface they all have, most transfers which cannot be done by reading a disc are made in this way. A serial cable is required, with the appropriate plug at each end, and some appropriate terminal software. Early ideas in this direction involved typing commands on both keyboards (a program like this for model B to Compact transfer was published in *Acorn User* in January 1987). But these days, all the control is from one machine, and a slave program is downloaded into the other.

Note that the serial method of transfer is just an enabling device. If the data itself is incompatible, it won't help. Serial transfer programs must be able to transfer 8-bit data, and file information like load and execution addresses, if they are to be used for anything other than plain text.

The wire connection needed is either three or five wires. A three-wire connection consists of earth (also called ground) on one plug to earth on the other, plus data in on each plug to data out on the other. Usually a five-wire connection is made, to allow 'hardware handshaking'. Handshaking is the process by which the transmitting computer pauses if the receiving computer is unable to keep up. A five-wire connection allows one computer to signal when it is ready to receive data (Request To Send, RTS). The other computer then knows it is Clear To Send (CTS). So the RTS on each plug is attached to CTS on the other. But some computers, notably the Mac, do not perform correct hardware handshaking, and so a three-wire connection will do, with software handshaking.

All dedicated machine-to-machine transfer programs handle this, but if you make your transfers using ordinary terminal software, best to use a file transfer protocol such as XMODEM at each end. Handshaking either in software or hardware makes sure that the computer is ready to deal with what is sent to it, so no data is lost. If no handshaking is available, you must perform the transfer at a very slow speed. I once transferred a whole book text from an Amstrad PCW to a Macintosh, and in the absence of proper terminal software, I had to do the whole lot at 75 baud – only a fast typing speed. It took six hours in total.

Another way of transferring files between machines is to use a modem. You can make a user-to-user connection, in which case normal terminal software with file transfer options is used simultaneously at each end. (It's best to use a manual modem to do this.) More simply, one party can upload the file to a bulletin board or electronic mail system, and the other party can download it later to a different type of machine. Besides removing the necessity of having both machines in the same place, this may also be a more familiar procedure than a direct link, but it does introduce the problem of line noise. And it's only really suitable for text files – few electronic mail systems can deal with 8-bit binary data. Sending non-text files this way is usually difficult; one exception is that *Pipedream* spreadsheets can be treated as though they are text files.

Cables for serial transfer are easy to obtain. The silly prices of a few years ago have been eroded by competition, and virtually any dealer will supply any of the required cables for about £5 or £7. PCs and STs use the standard 25-pin connector as found on modems and other serial devices. Macs and Z88s require unique connectors, but again, there should be no difficulty in obtaining the right cables fairly cheaply. If you have lots of micros, then a set of computer to standard male 25-pin cables may be your best bet. A null modem device – a small £5 box which is basically two female 25-way connectors back to back with the data and CTS/RTS pins cross-connected – allows you to link any two machines correctly with a minimum of fuss. Each individual cable also doubles up as a modem cable. If you get a new computer, all you have to ask for is a modem cable, and you can then immediately transfer data from all the other machines.

CONNECTIVITY CHART

	IBM PC	Macintosh	Amiga	Atari ST	Z88	CP/M
Reading BBC discs on other machines	*BeebDOS*, with hardware restrictions	Not possible: controller differences	Possibly with forthcoming emulator	No known package	No disc drives	Only the Acorn Z80 system
Reading other discs on BBC micros	*DOScopy*, Master 512, or utility like *ADI*	Not possible	Not possible with normal Amiga discs	Same as IBM	No discs	Acorn Z80, Master 512 or *ADI*
Graphics from BBC	*BGraph* (part of *BeebDOS*) has good range of options	HCI's *Screen to Mac*	Possibly with emulator	Straight-forward but no software	No graphics	Only via *DOS*. No known direct packages
Graphics to BBC	Straightfor-ward but no software	HCI's *Screen to Mac*	No known package	Straight-forward but no software	No graphics	Only via *DOS*. No software
Other data	*BConv* in *BeebDOS*, *Pipedream*	HCI's *View to Mac*	Only through emulator	*First Word Plus*	*Pipedream*	Via *DOS*

easy. A version of BBC Basic now exists for just about every worthwhile machine on the market. M-Tec publishes versions of BBC Basic for CP/M and MS-DOS machines.

The latest MS-DOS version, BBC Basic 86 (Plus), will run virtually all BBC Basic 4 programs, and supports all PC graphics standards up to VGA. It even has a mode 7 emulator, and comes with a copious manual, which lists every difference from the Acorn implementation.

Basic 86 was written by Richard Russell, who was involved in the original BBC micro specification. Long-time readers of *Acorn User* will remember him as the author of the fix to the famous OS 0.1 cassette bug.

Both Z80 (CP/M) and 8086 (PC) versions include the relevant in-line assembler. They can't assemble Acorn programs with 6502 assembly language, but they can assemble machine code for their own native processors

For the Macintosh, an implementation of the language is supplied by Human-Computer Interface. As the standard Mac runs in mono, and doesn't have an 80-column screen as such, some small changes have been made.

But on the other hand, many of the Mac's more advanced features are utilised, particularly in the area of program editing. Basic 4 is fully implemented, and WHILE...END-WHILE. CASE, block structured IF, extended TRACE, SWAP, MID$=, and the new graphics commands have been included from Basic 5. However, it does not feature a 68000 assembler.

The Amiga has a new 68000-based BBC Basic included in the Commodore BBC emulator, details of which aren't fully available yet. Atari was rumoured to be developing a BBC emulator for its ST, but this hasn't appeared yet.

However, a very close cousin of BBC Basic is produced for the machine by Computer Concepts, authors of both *Wordwise* and *InterWord*. Fast Basic, as it's called, contains a wide range of BBC-like structures such as functions and procedures with full parameter passing, indirection operators, and also a full in-line 68000 assembler.

The Z88, of course, has its own resident version of BBC Basic, again written by Richard Russell and presumably derived from his CP/M version.

The implementation is appropriate to the hardware on which it runs – for example, graphics are not supported, and text windows don't behave in the same way. Basic 4 is partially there – LIST IF is supported, however EDIT is not. It is perfectly possible to write and debug programs on the BBC, with its full range of editing and development tools, and then you can easily run the programs on the Z88.

All these versions are interpreters, but the M-Tec IBM version and Atari Fast Basic both come with run-time modules, which can be used to produce code which can run without the full language being present.

DOSCopy: *from BakSoft, 20 Leys Avenue, Cambridge CB4 2AW.* Master 512 upgrade board: *from Watford Electronics, 250 High Street, Watford WD1 3AN.* Arc PC Emulator: *from any Acorn dealer.* MDFS: *from SJ Research, 108 Mill Street, Cambridge.* BeebDOS: *from Boss Software, Microboss Ltd, 3 Hadleigh Road, Frinton, Essex CO13 9HG.* View to Mac version 2, Screen to Mac, BBC Basic: *from Human Computer Interface Ltd, 11 Brunswick Walk, Cambridge CB5 8DH.* First Word Plus: *Archimedes version from any Acorn dealer; ST version from any Atari dealer. Z88 and most Z88 transfer programs: from Cambridge Computer, 10 Bridge Street, Cambridge.* Pipedream (PC, Arc) View Professional (BBC): *from Colton Software, Broadway House, 149-151 St Neots Road, Hardwick, Cambridge CB3 7QJ.* BBC Basic 86 (Plus): *from M-Tec Computer Services (UK), 4 Church Hill, Reepham, Norfolk NR10 4JL.* FastBasic for the Atari ST: *from Computer Concepts, Gaddesden Place, Hemel Hempstead, Hertfordshire, HP2 6EX.*

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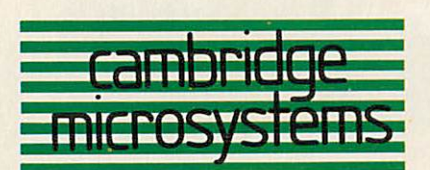


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HIDDEN POWER

Spreadsheets are little known and little used in schools, even though they have a variety of uses in a number of disciplines.

Chris Drage and Nick Evans

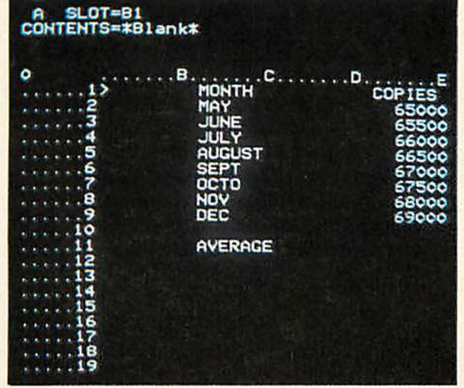
In a recent speech, Humberside Director of Education, Dr Michael Garnett, described differences in approach to the use of school resources by teachers of various disciplines. He told the story of a group of teachers who were set the task, on an INSET course, of measuring the height of a church tower. Each person was given one tool – a barometer – and sent off to accomplish the mission. The physics teacher measured the barometric pressure at the foot of the tower, climbed up with the barometer and measured the pressure again and was able scientifically to deduce the height of the tower.

The mathematician climbed the tower, set his stopwatch and dropped the barometer from the top of the tower. The time of descent led to the answer. The CDT teacher lowered the barometer on a string, measured the length of the string and recorded the result. The business studies teacher took the barometer to the vicarage and asked the vicar's wife to disclose the height of the tower, and then gave her the barometer as a present for her help.

Although it illustrates a different point, this story is an instructive parable about the diversity of teachers' attitudes to the use of computers and software in the classroom. Widely differing uses are made of the same software across the subject disciplines.

But there's one particular generic package, the spreadsheet, that hasn't penetrated the school software scene to the extent that might have been expected – despite the fact that it is content-free and highly versatile. This article looks at spreadsheets, and examines some of the uses that might be made of them in a number of subject disciplines, in the hope that it might prompt some more imaginative thinking.

A spreadsheet is a computer 'environment' in which you can mix text, numbers and formulae to provide a constantly updated accounting or reckoning system. It's rather like a giant sheet of squared paper. Each square is a *cell* which may contain text, a number or a formula. Each cell may be related to others by means of its grid reference. So for instance cell A1 may contain 365, the number of days in the year. Cell A2 may contain 24, the number of hours in the day, and cell A3 could contain the formula A1 × A2, giving the answer of 8760 hours in a year. Change either of the two factors in A1 or A2 and the result will immediately be updated.



ViewSheet: good companion to . . .

The Medusa Guide to

Spreadsheets Across the Curriculum

Medusa's school spreadsheet guide

Widely used in the world of industry and commerce, the spreadsheet is regarded by many as the one computer tool that so far remains undiscovered by most schools. This is despite the fact that every Master 128 contains the *ViewSheet* spreadsheet built into the machine. For some, this is proof that the spreadsheet is really a solution looking for a problem, so it isn't favoured by educationalists who see its use as being technology-led rather than curriculum-led. Nonetheless, there are useful applications to be made in the classroom.

Using a spreadsheet it is possible, for example, to create a reckoning system connected to a menu planner. Each recipe ingredient could have its quantity governed by a formula, so that changing the number of portions required automatically updates all the quantities. This is a very simple application, in which all quantity cells on the spreadsheet are governed by the value of the portions cell – a simple multiplication exercise.

Much more complex operations are possible. In the world of business, whole year's financial statements are calculated using the spreadsheet. Some spreadsheet software even has in-built standard accounting formulae. This potential for complex operations proves the spreadsheet's worth, for example in the laboratory – chemical titration would be a good example. Known formulae can govern experimentation by pupils and confirm or seek to explain the outcome of their actual experiments.

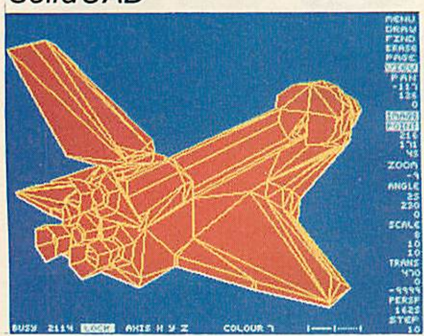
So what material is there to help a teacher new to spreadsheets? Sadly, not a great deal. Although there has been some research on the use of this material in schools, little of it has ever developed into published teaching materials. But there are three sources of information to help you. MEDU publishes a series of guides, one of which deals with the use of spreadsheets generally. 'Spreadsheets in the Curriculum' is aimed at the beginner and assumes you have access to *ViewSheet,* although it could be used with other packages. It takes you through a series of graded exercises designed to introduce the fundamental principles of the operation of a spreadsheet. But it provides no curriculum support, except

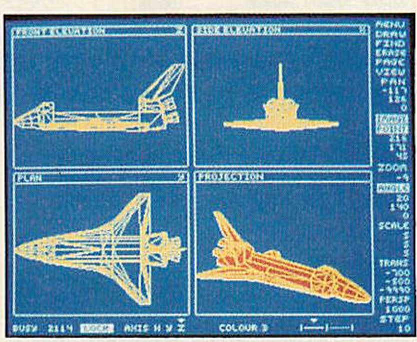
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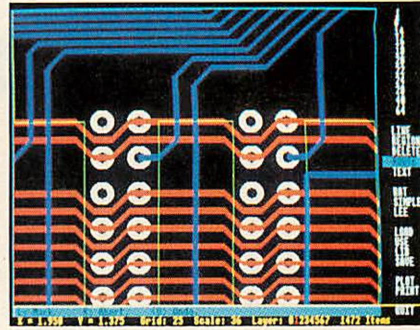
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insofar as it may also be used as an introductory package for pupils about to use spreadsheets.

A similar pack has just been released by ESM. 'An Introduction to *ViewSheet*', which costs £17.50 for a pack of five booklets, comprises a student workbook with sets of half-hour developmental exercises designed to introduce *ViewSheet* gradually. A disc is available for £5, with all the exercises ready-prepared. It also contains the materials for the sister packages which deal with *View* and *ViewStore*. But again, this material does not provide any curriculum context.

The third is the support materials that accompany *Grasshopper*, described below. This material puts the spreadsheet much more into a teaching context, although the documentation readily admits that the place of the spreadsheet has yet to be proven in the curriculum. Nonetheless, there are worked examples of applications dealing mostly with mathematical topics. Ideas such as the development of the Fibonacci series using the spreadsheet help children to understand the processes behind the mathematical principle. There are also simple accounting and statistical applications such as Tuck Shop accounts and Traffic Survey Plotting. A series of tasks in the documentation highlight the spreadsheet's potential for use in problem-solving. One such idea is the use of the software for predicting the number of seats won by political parties in a General Election.

In addition to these materials, a number of companies market dedicated spreadsheets – specific applications that behave in the same fashion as a spreadsheet. RBRC Software, Resource, MEDU, SCET and LTS are a few of the companies that provide simulations which are useful for introduction to spreadsheets in a 'real life' – often business-based – context.

Not all spreadsheets are suitable for use in education. The leader in the field must be *Grasshopper*, published by Newman College, which has already been taken up on licence by two-thirds of Education Authorities. It is recommended for use in simple investigations and for testing hypotheses. Roger Keeling, head of Newman's computer centre, says that one of his main principles in using computer tools is to check whether data entered into a database might not more appropriately be handled in a spreadsheet. If you wish to sort and select records, obviously databases are more appropriate; but if you wish to modify the information to test a hypothesis or you want to graph the results of your research, then a spreadsheet – especially *Grasshopper* – will be of more use. Check with your LEA adviser or computer centre whether your authority has a licence for *Grasshopper*, in which case you will be able to get a copy at minimal cost.

Acornsoft's *ViewSheet* is a much more powerful package than *Grasshopper*, although its principles are similar. Indeed, if you can use one spreadsheet then generally, apart from some differences of syntax, you should be able to use any. *ViewSheet* is part of the *View* family, and therefore data and text from *ViewSheet* and *View* may be passed between the packages – see the poster in last month's *Acorn User* for some guidance here. This software is reputed to be rather unfriendly, but it repays the effort of overcoming obscure documentation. The 'grown-up' version of this package is *View Professional*, which embodies the very powerful principles displayed in Colton Software's *Pipedream* package which grew out of it. *Acorn User* reviewed *View Professional* in October 1987, and *Pipedream* on the Archimedes in October 1988.

Also available for the Archimedes is Minerva's *System Gamma*. This provides an extremely powerful spreadsheet environment. Although it has been designed with the business market in mind, it is sufficiently powerful to be much more user-friendly than *ViewSheet* in many areas. In common with that package, however, it lacks an integral graphing facility – you have to use *Gammaplot* or *ViewPlot* to obtain graphic results. Dave Futcher reviewed *SigmaSheet* in *Acorn User* in September 1988.

What can teachers and pupils do with a spreadsheet? The box on the left gives a brief overview of topics for spreadsheet use, related to specific curricular areas. Unfortunately the hard part is entirely yours – to create the teaching materials relating to the idea sparked off by any of these suggestions.

All of the ideas presented here presuppose that you have become familiar with at least the basics of spreadsheet use. Undoubtedly you will have many other ideas which you know from classroom experience are practical. If so, we would like you to send your ideas to *BBC Acorn User's* letters page, and we shall try to pass your experiences on to other people.

SPREADSHEET TOPICS

Science (Maths, Physics, Chemistry, Biology)
Mathematical modelling
Problem-solving
Data collection and hypothesis testing
Equation testing
Statistics and statistical analysis
Experiment replication (eg titration)
Using formulae
Physiological simulation (balancing vital signs against variables

Communications (Language, Business & Office Skills
Business applications (cash flow forecasting)
Small school business (Tuck Shop, Book Club, PTA Events, etc)
Stock Exchange competitions

CDT (Heavy and Light Craft, Technical Design, Control
Bill of materials and costings
Variable design parameters (sizings)

Home Economics
Costings for recipes
Domestic accounting

Humanities (History, Geography, Sociology, RE, PSD)
Economic survival
Demography

Performing Arts
Production costs
Seat reservations
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Correlating lighting, sound effects

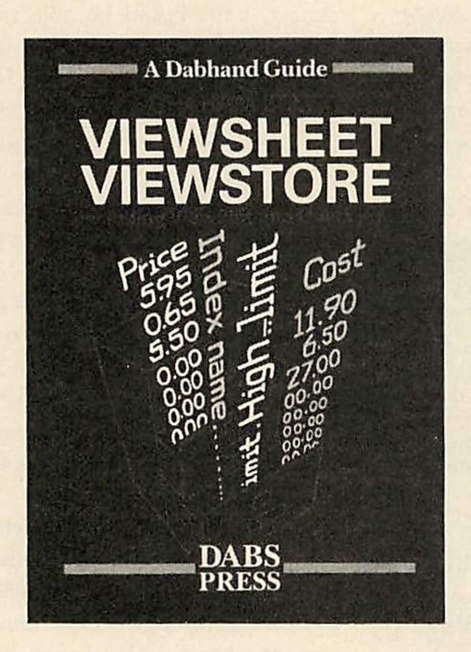
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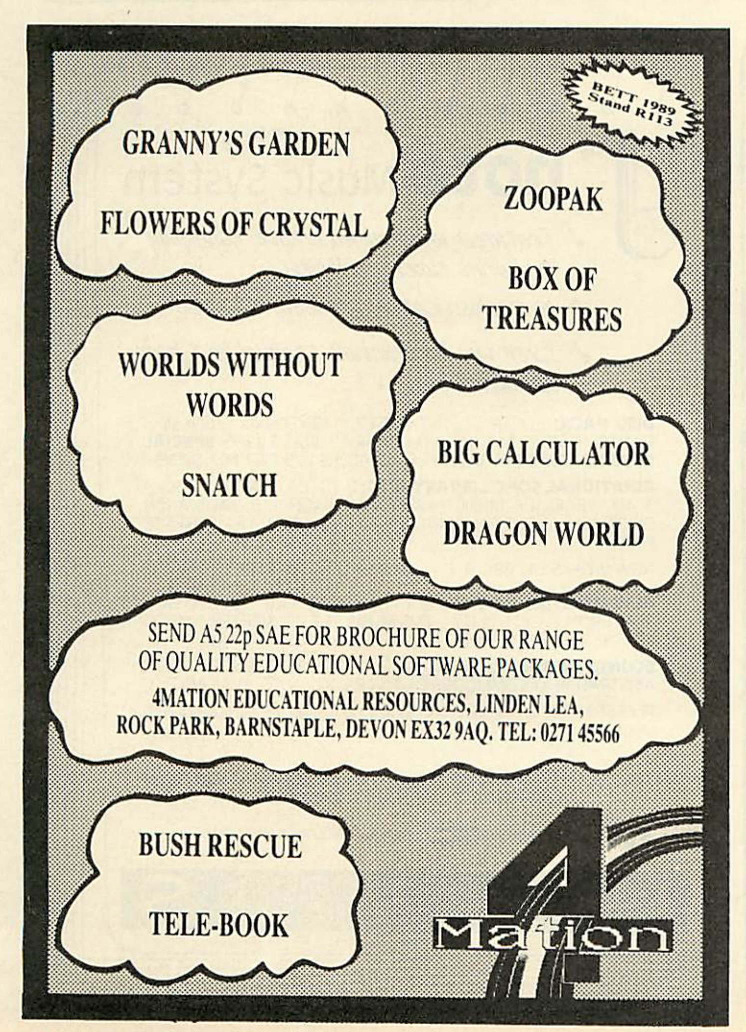
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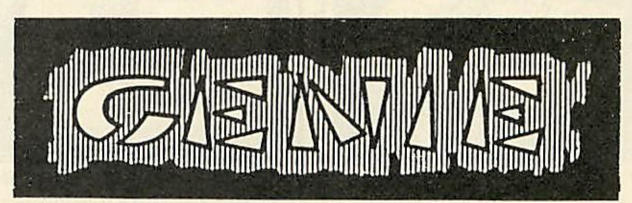


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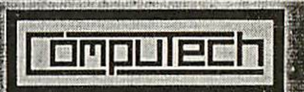
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COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly Disc
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Listing 3		■	■	■	■	■	■	■	■	■	■	■
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Top of the List	108											
Listing 1-2		■	■	■	■			■	■	■	■	■

Note
1. Requires View/ViewSheet/ViewStore. Each one of the 'listings' should be typed into View as a text file. Therefore, make sure you use no rulers or embedded commands when doing so. Save each 'listing' under the filename given. ie. for Listing 4, use 'WOSAVE' as the filename. 2. Requires Shadow RAM. 3. Requires AMPLE.

HINTS & TIPS

See Hints & Tips, page 41

Listing 1. Prefix command for ViewSheet

```
   10 REM PREFIX for Vie
wSheet
   20 REM by Brian Ross
   30 REM for B/B+/E/M/C
   40 REM (c) BBC Acorn
User Feb 89
   50 :
   60 code=&900
   70 findv=&21C
   80 zp=&90
   90 INPUT "Alternative
 directory specification
 : " d$
  100 :
  110 FOR pass=0 TO 3 ST
EP 3
  120 P%=code
  130 [OPT pass
  140 .init
  150 LDA findv
  160 STA ofindv
  170 LDA findv+1
  180 STA ofindv+1
  190 LDA #newfind MOD 2
56
  200 STA findv
  210 LDA #newfind DIV 2
56
  220 STA findv+1
  230 RTS
  240 :
  250 .newfind
  260 PHP
  270 CMP #0
  280 BEQ out
  290 PHA
  300 STX zp
  310 STY zp+1
  320 LDY #0
  330 LDA (zp),Y
  340 AND #&DF
  350 CMP #ASC"V"
  360 BNE out1
  370 INY
  380 LDA (zp),Y
  390 CMP #ASC"."
  400 BNE out1
  410 LDX #0
  420 .loop
  430 LDA (zp),Y
  440 STA filename,X
  450 CMP #&0D
  460 BEQ loopout
  470 INY
  480 INX
  490 JMP loop
  500 .loopout
  510 LDX #pathname MOD
256
  520 LDY #pathname DIV
256
  530 PLA
  540 JMP out
  550 .out1
  560 PLA
  570 LDX zp
  580 LDY zp+1
  590 .out
  600 PLP
  610 JMP (ofindv)
  620 :
  630 .ofindv
  640 OPT FNequw(0)
  650 .pathname
  660 OPT FNequs(d$)
  670 .filename
  680 ]
  690 NEXT
  700 A$="SAVE PREFIX "+
STR$~code+"+FF"
  710 PRINT A$
  720 PRINT"Press any ke
y to save"
  730 IF GET
  740 PROCoscli(A$)
  750 END
  760 :
  770 DEF FNequw(b%)
  780 ?P%=b% MOD 256
  790 P%?1=b% DIV 256
  800 P%=P%+2
  810 =pass
  820 :
  830 DEF FNequs(b$)
  840 $P%=b$
  850 P%=P%+LEN(b$)
  860 =pass
  870 :
  880 DEF PROCoscli(stri
ng$)
  890 DIM X% &FF
  900 Y%=X% DIV 256
  910 $X%=string$
  920 CALL &FFF7
  930 ENDPROC
```

Listing 2. File status reloader

```
   10 REM Report on open
 files
   20 REM by Joe Abley
   30 REM for B/B+/E/M/C
   40 REM (c) BBC Acorn
 User Feb 89
   50 :
   60 code%  = &0900
   70 :
   80 oswrch = &FFEE
   90 osasci = &FFE3
  100 osbyte = &FFF4
  110 osnewl = &FFE7
  120 osgbpb = &FFD1
  130 osfile = &FFDD
  140 osargs = &FFDA
  150 oscli  = &FFF7
  160 errv   = &0202
  170 zpage  = &70
  180 :
  190 FOR pass=0 TO 3 ST
EP 3
  200 P%=code%
  210 :
  220 [OPT pass
  230 :
  240 .files
  250 SEI
  260 LDA errv
  270 STA olderr
  280 LDA errv+1
  290 STA olderr+1
  300 LDA #newerr MOD &1
00
  310 STA errv
  320 LDA #newerr DIV &1
00
  330 STA errv+1
  340 CLI
  350 TSX
  360 STX stack
  370 :
  380 LDA #7
  390 JSR osfsc
  400 STX low
  410 INY
  420 STY high
  430 .loop
  440 LDY low
  450 LDA #0
  460 LDX #zpage
  470 JSR osargs
  480 LDY low
  490 LDA #2
  500 LDX #zpage+4
  510 JSR osargs
  520 LDA flag
  530 BMI next
  540 LDX #0
  550 .print
  560 LDA text,X
  570 JSR osasci
  580 INX
  590 CMP #0
  600 BNE print
  610 DEC flag
  620 .next
  630 JSR space
  640 LDA #ASC"&"
  650 JSR oswrch
  660 LDA low
  670 JSR hex
  680 JSR space
  690 LDX #zpage+3
  700 JSR hex4
  710 JSR space
  720 LDX #zpage+7
  730 JSR hex4
  740 JSR osnewl
  750 :
  760 .newerr
  770 INC low
  780 LDA low
  790 CMP high
  800 BCC more
  810 SEI
  820 LDA olderr
  830 STA errv
  840 LDA olderr+1
  850 STA errv+1
  860 CLI
  870 LDX stack
  880 TXS
  890 RTS
  900 .more
  910 LDX stack
  920 TXS
  930 JMP loop
  940 :
  950 .osfsc
  960 JMP (&21E)
  970 .space
  980 LDA #32
  990 JMP oswrch
 1000 .hex
 1010 PHA
 1020 LSR A
 1030 LSR A
 1040 LSR A
 1050 LSR A
 1060 JSR digit
 1070 PLA
 1080 .digit
 1090 AND #15
 1100 SED
 1110 CLC
 1120 ADC #&90
 1130 ADC #&40
 1140 CLD
 1150 JMP oswrch
 1160 .hex4
 1170 LDY #3
 1180 .loop4
 1190 LDA 0,X
 1200 JSR hex
 1210 DEX
 1220 DEY
 1230 BPL loop4
 1240 RTS
 1250 :
 1260 .text
 1270 OPT FNequb(13)
 1280 OPT FNequs("Hand P
ointer  Extent")
 1290 OPT FNequb(13)
 1300 OPT FNequb(0)
 1310 .flag
 1320 OPT FNequb(0)
 1330 .stack
 1340 OPT FNequb(0)
 1350 .olderr
 1360 OPT FNequw(0)
 1370 .high
 1380 OPT FNequb(0)
 1390 .low
 1400 OPT FNequb(0)
 1410 ]NEXT
 1420 :
 1430 A$="SAVE FILES "+S
TR$~(code%)+" "+STR$~(P%
)
 1440 PRINT "Press any k
ey to save"
 1450 IF GET
 1460 PROCoscli(A$)
 1470 END
 1480 :
 1490 DEF FNequb(b%)
 1500 ?P%=b%
 1510 P%=P%+1
 1520 =pass
 1530 :
 1540 DEF FNequw(b%)
 1550 ?P%=b% MOD 256
 1560 P%?1=b% DIV 256
 1570 P%=P%+2
 1580 =pass
 1590 :
 1600 DEF FNequs(b$)
 1610 $P%=b$
 1620 P%=P%+LEN(b$)
 1630 =pass
 1640 :
 1650 DEF PROCoscli(stri
ng$)
 1660 DIM X% &FF
 1670 Y%=X% DIV 256
 1680 $X%=string$
 1690 CALL &FFF7
 1700 ENDPROC
```

Listing 3. Spooled graphics transformations

```
   10 REM Image Manipula
tor
   20 REM By Peter Mille
r
   30 REM For B/B+/M/C/E
/A
   40 REM (c) Acorn User
 Feb 89
   50 :
   60 MODE 1
   70 PRINT "Spooling im
age... ";
   80 *SPOOL HOUSE
   90 GCOL 0,1
  100 MOVE 0,0
  110 MOVE 200,0
  120 PLOT 85,0,200
  130 PLOT 85,200,200
  140 GCOL 0,2
  150 PLOT 85,100,300
  160 GCOL 0,3
  170 MOVE 140,260
  180 MOVE 160,240
  190 PLOT 85,140,300
  200 PLOT 85,160,300
  210 *SPOOL
  220 IF INKEY(200)
  230 :
  240 CLS
```

Continued ▶

◀ **Spooled graphics transformations continued**

```
250 PRINT "Manipulatin
g image... ";
260 FOR i%=0 TO 4
270 VDU 29,i%^2*50;500
;
280 *EXEC HOUSE
290 PROCimage(-i%*20,(
i%+1)/4)
300 NEXT
310 PRINT
320 END
330 :
340 DEF PROCimage(angl
e,scale)
350 cos=COS(RAD(angle)
)
360 sin=SIN(RAD(angle)
)
370 REPEAT
380 code%=INKEY(10)
390 IF code%=18 GCOL G
ET,GET
400 IF code%<>25 GOTO
460
410 VDU 25,GET
420 x%=(GET+GET*256)*s
cale
430 y%=(GET+GET*256)*s
cale
440 VDU x%*cos-y%*sin;
450 VDU x%*sin+y%*cos;
460 UNTIL code%=-1
470 ENDPROC
```

Listing 4-9. Cheaper Keeper

```
1. WOSAVE

MODE 128
*SAVE wozp 0 90
*SAVE wows 400 800
*SAVE womr E00 8000

2. WOLOAD

MODE 128
*WORD
*DIR $.WORDFILES
*LOAD wozp
*LOAD wows
*LOAD womr
*WORD

3. SHSAVE

MODE 128
*SAVE shzp 0 90
*SAVE shws 400 800
*SAVE shmr E00 8000

4. SHLOAD

MODE 128
*SHEET
*DIR $.SHEETFILES
*LOAD shzp
*LOAD shws
*LOAD shmr
*SHEET

5. STSAVE

MODE 128
*SAVE stzp 0 90
*SAVE stws 400 800
*SAVE stmr E00 8000

6. STLOAD

MODE 128
*STORE
*DIR $.STOREFILES
*LOAD stzp
*LOAD stws
*LOAD stmr
*STORE
```

See Archimedes Agora, page 46

Listing 1. 24-pin screen dump

```
10 REM Agora - listing 1
20 REM BAUPrint module source
30 REM by Dave Acton
40 REM for Archimedes only
50 REM (c) BAU February 1989
60 :
70 DIM code% &2000
80 x=0:pars=0
90 y=1
100 number=2
110 temp=3
120 temp2=4:min=4
130 temp3=5:max=5
140 base=6:repeat=6
150 column=7:shade=7
160 byte=8:count=8
170 row=9:colcount=9:numlev=9
180 subrow=10:factorbase=10
190 bytecount=11:brightfact=11
200 database=12
210 sp=13
220 link=14
230 pc=15
240 FOR pass%=4 TO 6 STEP 2
250 P%=0:O%=code%
260 [OPT pass%
270 EQUD 0
280 EQUD 0
290 EQUD 0
300 EQUD 0
310 EQUD title
320 EQUD help
330 EQUD commandtable
340 .title
350 FNequz("BAUPrint")
360 .help
370 FNequz("BAUPrint"+CHR$(9)+"1.00 ("
+MID$(TIME$,5,11)+")")
380 .commandtable
390 FNequz("BAUDump24")
400 EQUD audump
410 EQUD &00FF0000
420 EQUD audumpsyntax
430 EQUD audumphelp
440 EQUD 0
450 :
460 .audumphelp
470 EQUS"BAUDump24 dumps the current (
graphics) screen to an Epson compatible
24-pin printer using grey-scales as spec
ified."
480 EQUB 13
490 .audumpsyntax
500 FNequz("Syntax: *BAUDump24 [-type
<0-7>][-contrast <0-64>][-shades <2-256>
]")
510 :
520 .audump
530 STMFD (sp)!,{R0-R12,link}
540 MOV temp,#0
550 STR temp,invert
560 ADR database,dumpdata+64
570 MOV brightfact,#16
580 MOV numlev,#1
```

Continued ▶

◀ **24-pin screen dump continued**

```
590 .decode
600 LDRB temp,[pars],#1
610 CMP temp,#13
620 BEQ decoded
630 CMP temp,#ASC"-"
640 BNE decode
650 MOV temp3,#0
660 ADR base,suffices
670 .dec2
680 MOV count,#0
690 .dec3
700 LDRB temp,[base,count]
710 CMP temp,#255
720 BNE nobadthing
730 .badthing
740 ADR R0,badsuffix
750 SWI "OS_GenerateError"
760 .badsuffix
770 EQUD 0
780 FNequz("Invalid parameters - use *Help")
790 .nobadthing
800 LDRB temp2,[pars,count]
810 CMP temp2,#32
820 BLE foundone
830 CMP temp2,temp
840 ADDEQ count,count,#1
850 BEQ dec3
860 .skiptonextone
870 LDRB temp,[base]
880 ADD base,base,#1
890 CMP temp,#0
900 BNE skiptonextone
910 ADD temp3,temp3,#1
920 B dec2
930 .foundone
940 ADD pc,pc,temp3,ASL #2
950 EQUS "ROCK"
960 B checktype
970 B checkcont
980 B checkshade
990 B inv
1000 .checktype
1010 MOV min,#0
1020 MOV max,#7
1030 BL getnum
1040 BVS badthing
1050 ADR database,dumpdata
1060 ADD database,database,number,ASL #4
1070 B decode
1080 .checkcont
1090 MOV min,#0
1100 MOV max,#64
1110 BL getnum
1120 BVS badthing
1130 MOV brightfact,number
1140 B decode
1150 .checkshade
1160 MOV min,#2
1170 MOV max,#256
1180 BL getnum
1190 BVS badthing
1200 MOV numlev,#0
1210 MOVS number,number,LSR #1
1220 .howmanyshades
1230 ADDNE numlev,numlev,#1
1240 MOVNES number,number,LSR #1
1250 BNE howmanyshades
1260 B decode
1270 .inv
1280 MOV temp,#&FF
1290 STR temp,invert
1300 B decode
1310 .decoded
1320 SWI "OS_RemoveCursors"
1330 RSB temp,numlev,#8
1340 MOV temp2,#&FF
1350 MOV temp2,temp2,ASL temp
1360 AND temp2,temp2,#&FF
1370 STR temp2,levels
1380 ADR base,pal
1390 MOV count,#255
1400 .makepal
1410 MOV R0,count
1420 MOV R1.#16
1430 SWI "OS_ReadPalette"
1440 MOV colcount,#3
1450 ADR factorbase,factors
1460 MOV shade,#0
1470 .getparts
1480 MOV R2,R2,LSR #8
1490 LDR temp,[factorbase],#4
1500 AND temp2,R2,#&FF
1510 MUL temp3,temp,temp2
1520 ADD shade,shade,temp3
1530 SUBS colcount,colcount,#1
1540 BNE getparts
1550 MUL temp,shade,brightfact
1560 MOV shade,temp,LSR #20
1570 CMP shade,#&FF
1580 MOVGT shade,#&FF
1590 LDR temp,invert
1600 EOR shade,shade,temp
1610 STRB shade,[base,count]
1620 SUBS count,count,#1
1630 BPL makepal
1640 SWI &100+2
1650 FNsend(27)
1660 FNsend(ASC"3")
1670 FNsend(24)
1680 MOV row,#(1024-32)<<16
1690 .rowloop
1700 MOV column,#0
1710 FNsend(27)
1720 FNsend(ASC"*")
1730 SWI &101
1740 LDRB R0,[database,#4]
1750 SWI "OS_WriteC"
1760 LDR bytecount,[database,#12]
1770 SWI &101
1780 AND R0,bytecount,#&FF
1790 SWI "OS_WriteC"
1800 SWI &101
1810 MOV R0,bytecount,LSR #8
1820 SWI "OS_WriteC"
1830 .columnloop
1840 MOV subrow,#32<<16
1850 MOV byte,#0
1860 MOV repeat,#0
1870 .makebyte
1880 LDR temp,[database,#8]
1890 SUBS subrow,subrow,temp
1900 BMI donesubrow
1910 ADD y,row,subrow
1920 MOV y,y,LSR #16
1930 MOV x,column,LSR #16
1940 SWI "OS_ReadPoint"
1950 ADR temp,pal
1960 LDRB R2,[temp,R2]
1970 LDR temp,seed
1980 LDR temp2,eor
1990 MOV temp3,#32
2000 .randloop
2010 MOVS temp,temp,LSL #1
2020 EORCS temp,temp,temp2
2030 SUBS temp3,temp3,#1
2040 BNE randloop
```

Continued ▶

◀ **24-pin screen dump continued**

```
2050 STR temp,seed
2060 AND temp,temp,#&FF
2070 LDR temp2,levels
2080 AND R2,R2,temp2
2090 CMP R2,temp2
2100 MOVEQ R2,#&100
2110 CMP R2,temp
2120 MOV byte,byte,ASL #1
2130 ADDLE byte,byte,#1
2140 ADD repeat,repeat,#1
2150 TST repeat,#%111
2160 BNE dontsend
2170 SWI &101
2180 MOV R0,byte
2190 SWI "OS_WriteC"
2200 .dontsend
2210 B makebyte
2220 .donesubrow
2230 LDR temp,[database]
2240 ADD column,column,temp
2250 SUBS bytecount,bytecount,#1
2260 BNE columnloop
2270 FNsend(10)
2280 FNsend(13)
2290 SUBS row,row,#32<<16
2300 BPL rowloop
2310 SWI &100+3
2320 SWI "OS_RestoreCursors"
2330 LDMFD (sp)!,{R0-R12,pc}
2340 :
2350 .getnum
2360 STMFD (sp)!,{link}
2370 .skipspaces
2380 LDRB temp,[pars,count]
2390 CMP temp,#32
2400 ADDEQ count,count,#1
2410 BEQ skipspaces
2420 STMFD (sp)!,{pars,min,max}
2430 ADD R1,pars,count
2440 MOV R0,#10
2450 SWI "XOS_ReadUnsigned"
2460 LDMFD (sp)!,{pars,min,max}
2470 LDMFD (sp)!,{link}
2480 CMP number,min
2490 ORRLTS pc,link,#1<<28
2500 CMP number,max
2510 ORRGTS pc,link,#1<<28
2520 BICS pc,link,#1<<28
2530 :
2540 .suffices
2550 EQUS "type":EQUB 0
2560 EQUS "contrast":EQUB 0
2570 EQUS "shades":EQUB 0
2580 EQUS "invert":EQUB 0
2590 EQUB 255
2600 ALIGN
2610 :
2620 .dumpdata
2630 EQUD &40000:EQUD 0:EQUD &40000:EQUD 320
2640 EQUD &20000:EQUD 1:EQUD &40000:EQUD 640
2650 EQUD &20000:EQUD 2:EQUD &40000:EQUD 640
2660 EQUD &10000:EQUD 3:EQUD &40000:EQUD 1280
2670 EQUD &40000:EQUD 32:EQUD &40000/3:EQUD 320
2680 EQUD &20000:EQUD 33:EQUD &40000/3:EQUD 640
2690 EQUD &20000*2/3:EQUD 39:EQUD &40000/3:EQUD 960
2700 EQUD &20000*2/6:EQUD 40:EQUD &40000/3:EQUD 1920
2710 :
2720 .factors
2730 EQUD 0.39*2^16:EQUD 0.51*2^16:EQUD 0.10*2^16
2740 :
2750 .invert
2760 EQUD 0
2770 .levels
2780 EQUD 0
2790 .seed
2800 EQUD &DCA1988
2810 .eor
2820 EQUD &1D872B41
2830 ]
2840 pal=P%
2850 P%+=&100:O%+=&100
2860 NEXT pass%
2870 PRINT"Bytes used: ";O%-code%
2880 SYS "OS_File",10,"BAUPrint",&FFA,,code%,O%
2890 PRINT"Module saved as 'BAUPrint'"
2900 END
2910 :
2920 DEF FNsend(b%)
2930 [OPT pass%
2940 SWI &101
2950 SWI &100+b%
2960 ]
2970 =0
2980 :
2990 DEF FNequz(s$)
3000 [OPT pass%
3010 EQUS s$
3020 EQUB 0
3030 ALIGN
3040 ]
3050 =0
```

Listing 2. Sprite demonstration

```
10 REM Agora - listing 2
20 REM Smooth sprites
30 REM by Simon Pettitt
40 REM for Archimedes only
50 REM (c) BAU February 1989
60 :
70 MODE 9
80 OFF
90 *SNEW
100 *FX 112,1
110 PROCdrawscreen
120 *FX 112,2
130 PROCdrawscreen
140 :
150 MOVE 0,0:MOVE 512,100
160 *SGET sprite
170 *FX 112,1
180 *FX 113,1
190 px=384:py=462
200 x=512:y=100
210 xx=384:yy=462
220 *FX 112,2
230 MOVE px,py:MOVE px+x,py+y
240 *SGET screen2
250 *FX 112,1
260 nx=px:ny=py
270 REPEAT
280 MOVE px,py:MOVE px+x,py+y
```

Continued ▶

◀ Sprite demonstration continued

```
290 *SGET screen
300 *SCHOOSE sprite
310 PLOT &ED,px,py
320 *FX 113,1
330 *SCHOOSE screen2
340 *FX 112,2
350 PLOT &ED,nx,ny
360 MOUSE nx,ny,b
370 MOVE nx,ny:MOVE nx+x,ny+y
380 *SGET screen2
390 *SCHOOSE sprite
400 PLOT &ED,nx,ny
410 *FX 113,2
420 *FX 112,1
430 *SCHOOSE screen
440 PLOT &ED,px,py
450 MOUSE px,py,b
460 UNTIL FALSE
470 :
480 DEF PROCdrawscreen
490 CLS
500 FOR r=800 TO 50 STEP -15
510 GCOL (r-50)/110
520 CIRCLE 640,512,r
530 NEXT
540 PRINTTAB(13,5)"Use the mouse to"
550 PRINTTAB(10,7)"move around the scr
een"
560 PRINTTAB(7,9)"The background is un
affected"
570 GCOL 1
580 RECTANGLE FILL 0,0,512,100
590 PRINTTAB(1,30)"BBC Acorn User"
600 ENDPROC
```

Listing 3. Fast circle routine

```
10 REM Agora - listing 3
20 REM Fast circles
30 REM by Dave Lawrence
40 REM for Archimedes only
50 REM (c) BAU February 1989
60 :
70 MODE 13
80 xc=0:yc=1:r=2:col=3
90 x=4:y=5:p=6:xp=7:yp=8
100 ad=9:base=10
110 sp=13:link=14:pc=15
120 DIM code% 1000,vdu% 16
130 !vdu%=149:vdu%!4=-1
140 SYS "OS_ReadVduVariables",vdu%,vdu
%+8
150 FOR pass%=0 TO 2 STEP 2
160 P%=code%
170 [OPT pass%
180 .circle
190 STMFD (sp)!,{link}
200 LDR base,screen
210 MOV x,#0
220 MOV y,r
230 MOV r,r,ASL #1
240 RSB p,r,#3
250 RSB yc,yc,#255
260 .main
270 ADD xp,xc,x
280 ADD yp,yc,y
290 FNplot
300 SUB yp,yc,y
310 FNplot
320 SUB xp,xc,x
330 ADD yp,yc,y
340 FNplot
350 SUB yp,yc,y
360 FNplot
370 ADD xp,xc,y
380 ADD yp,yc,x
390 FNplot
400 SUB yp,yc,x
410 FNplot
420 SUB xp,xc,y
430 ADD yp,yc,x
440 FNplot
450 SUB yp,yc,x
460 FNplot
470 CMP x,y
480 LDMGEFD (sp)!,{pc}
490 CMP p,#0
500 ADD p,p,x,ASL #2
510 ADD x,x,#1
520 ADD p,p,#6
530 BMI main
540 SUB p,p,y,ASL #2
550 ADD p,p,#4
560 SUB y,y,#1
570 B main
580 :
590 .screen
600 EQUD vdu%!8
610 ]:NEXT pass%
620 :
630 TIME=0
640 FOR i%=1 TO 1000
650 GCOL 0,RND(255)
660 CIRCLE RND(1280),RND(1024),RND(512
)
670 NEXT
680 t=TIME
690 PRINT"BASIC took ";t/100;" secs -
press a key"
700 key=GET
710 CLS
720 TIME=0
730 FOR i%=1 TO 1000
740 A%=RND(320):B%=RND(256)
750 C%=RND(128):D%=RND(256)-1
760 CALL circle
770 NEXT
780 t=TIME
790 PRINT"ARM code took ";t/100;" secs
"
800 END
810 :
820 DEF FNplot
830 [OPT pass%
840 CMP xp,#320
850 BCS P%+24
860 CMP yp,#256
870 BCS P%+16
880 ADD ad,base,yp,ASL #6
890 ADD ad,ad,yp,ASL #8
900 STRB col,[ad,xp]
910 ]
920 =""
```

JOE'S JOTTINGS

See Joe's Jottings, page 66

Listing 1. Surface modeller

```
   10 REM SurfaceSpeed
   20 REM by Joe Telford
   30 REM for B/B+/M/C/A
   40 REM (c) BBC Acorn User February 19
89
   50 :
   60 MODE 7
   70 PROCsetup
   80 PROCtitle(rd$,yw$,"Surface-Speed")
   90 REPEAT:REPEAT
  100 ch=FNmenu
  110 IF ch=1 THEN PROCnotes
  120 IF ch=2 THEN ptr=0:PROCsurface
  130 IF ch=3 THEN MODE 1:PROCmove:MODE
 7
  140 IF ch=4 THEN MODE 1:PROCinvestigat
e:MODE 7
  150 IF ch=5 THEN PROCresults
  160 IF ch=6 THEN RUN
  170 UNTIL ch=7
  180 UNTIL FNok
  190 *FX 12,0
  200 *FX 4,0
  210 CLS
  220 END
  230 :
  240 DEF PROCresults
  250 PROCbacking(yw$)
  260 IF ptr=0 THEN PROCdblht(rd$+"Sorry
, no results available!",5,8):PROCspace(
rd$):ENDPROC
  270 PROCdblht(be$+"Set up printer,",10
,6)
  280 PROCdblht(be$+"and press SPACE",11
,8)
  290 PROCdblht(be$+"to print the result
s",8,10)
  300 PROCdblht(rd$+"Or ESCAPE to cancel
",7,20)
  310 REPEAT UNTIL GET=32
  320 CLS
  330 VDU 2
  340 PRINT "Surface-Speed: A mathematic
al investigation from Acorn User"
  350 PRINT STRING$(79,"-")
  360 PRINT "Surface 1: "surface1$;TAB(2
0);"Speed: ";speed1;" m/s"
  370 PRINT "Surface 2: "surface2$;TAB(2
0);"Speed: ";speed2;" m/s"
  380 PRINT STRING$(79,"-")
  390 PRINT SPC(10);"Start Point";SPC(8)
;"Crossing point";SPC(8);"End Point"
  400 PRINT SPC(10);"Coordinates";SPC(9)
;"Coordinates";SPC(9);"Coordinates";SPC(
9);"time"
  410 PRINT "Run--------"+STRING$(3,"X---
------Y---------")+"secs---"
  420 FOR loop%=1 TO ptr:PRINT;loop%;
  430 FOR value=1 TO 7:PRINTTAB(value*10
);dist(loop%,value);
  440 NEXT:PRINT:NEXT
  450 PRINT STRING$(79,"-")
  460 VDU 3
  470 ENDPROC
  480 :
  490 DEF PROCinvestigate
  500 PROCdrawsurface
  510 PROCplacepoints
  520 cx=640:cy=400
  530 PROCdopoint
  540 PRINT "Cursor keys ^ & v move poin
t"
  550 PRINT "Shift gives small movements
"
  560 PRINT "RETURN key records your gue
ss"
  570 PRINT "AND ENDS THAT GO!  Now pres
s SPACE..";
  580 REPEAT UNTIL GET=32
  590 CLS
  600 PRINT "0,0"
  610 PRINTTAB(12,0);(cx-x1)/50;",";(cy-
y1)/50;TAB(26,0);(x2-x1)/50;",";(y2-y1)/
50
  620 PROCinfo
  630 REPEAT A%=FNmovit:UNTIL A%=13
  640 GCOL 0,3
  650 MOVE x1,y1:DRAW x2,y2
  660 DRAW cx,cy:DRAW x1,y1
  670 ptr=ptr+1
  680 dist(ptr,1)=-(cx-x1)/50
  690 dist(ptr,2)=0
  700 dist(ptr,3)=0
  710 dist(ptr,4)=(cy-y1)/50
  720 dist(ptr,5)=(x2-cx)/50
  730 dist(ptr,6)=(y2-y1)/50
  740 dist(ptr,7)=FNdist1/speed1+FNdist2
/speed2
  750 dist(ptr,7)=INT(dist(ptr,7)*100+.5
)/100
  760 CLS:PRINT "Press Space for the Mai
n Menu"
  770 REPEAT UNTIL GET=32
  780 ENDPROC
  790 :
  800 DEF FNmovit
  810 *FX 4,1
  820 A%=GET:B%=INKEY-1
  830 IF A%=139 THEN PROCcup
  840 IF A%=138 THEN PROCcdn
  850 IF A%=ASC("C") OR A%=ASC("c") THEN
 combo=1-combo
  860 PROCinfo
  870 =A%
  880 :
  890 DEF PROCinfo
  900 PRINTTAB(12,0);STRING$(12," ");TAB
(12,0);INT((cx-x1)*100/50+.5)/100;",";IN
T((cy-y1)*100/50+.5)/100
  910 PRINTTAB(0,1)"Dist:             "
  920 IF combo=1 THEN PRINTTAB(20,1);"Co
mbined     ";TAB(0,1)"Dist: ";INT((FNdist
1+FNdist2)*1000+.5)/1000
  930 IF combo=0 THEN PRINTTAB(0,1)"Dist
: ";INT(FNdist1*1000+.5)/1000;TAB(20,1)"
Dist: ";INT(FNdist2*1000+.5)/1000;TAB(35
)
  940 PRINTTAB(0,2)"Time:             "
  950 IF combo=1 THEN PRINTTAB(20,2);"Co
mbined     ";TAB(0,2)"Time: ";INT((FNdist
1/speed1+FNdist2/speed2)*1000+.5)/1000
  960 IF combo=0 PRINTTAB(0,2)"Time: ";I
NT(FNdist1*1000/speed1+.5)/1000;TAB(20,2
);"Time: ";INT(FNdist2*1000/speed2+.5)/1
000;TAB(35)
  970 ENDPROC
  980 :
  990 DEF FNdist1:=SQR(((cx-x1)/50)^2+((
cy-y1)/50)^2)
 1000 :
 1010 DEF FNdist2:=SQR((((x2-x1)/50)-((c
x-x1)/50))^2+(((y2-y1)/50)-((cy-y1)/50))
^2)
 1020 :
 1030 DEF PROCcup
 1040 IF B%=0 AND (cy+50)<895 THEN PROCd
opoint:cy=cy+50:PROCdopoint
 1050 IF B%=-1 AND (cy+2)<895 THEN PROCd
opoint:cy=cy+2:PROCdopoint
```

Continued ▶

◀ Surface modeller continued

```
 1060 ENDPROC
 1070 :
 1080 DEF PROCcdn
 1090 IF B%=0 AND (cy-50)>=0 THEN PROCdo
point:cy=cy-50:PROCdopoint
 1100 IF B%=-1 AND (cy-2)>=0 THEN PROCdo
point:cy=cy-2:PROCdopoint
 1110 ENDPROC
 1120 :
 1130 DEF PROCdopoint
 1140 GCOL 4,0
 1150 PROCrect(cx-8,cy-8,16,16,0)
 1160 ENDPROC
 1170 :
 1180 DEF PROCmove
 1190 PROCdrawsurface
 1200 PROCplacepoints
 1210 PRINT "SHIFT moves be point"
 1220 PRINT "CTRL moves rd point"
 1230 PRINT "Moves in Metres & RETURN fi
xes points"
 1240 PROCdomove
 1250 ENDPROC
 1260 :
 1270 DEF PROCdomove
 1280 *FX 4,1
 1290 REPEAT
 1300 A%=GET:B%=INKEY-1:C%=INKEY-2
 1310 IF A%=139 THEN PROCup
 1320 IF A%=138 THEN PROCdn
 1330 IF A%=137 THEN PROCrt
 1340 IF A%=136 THEN PROClt
 1350 UNTIL A%=13
 1360 ENDPROC
 1370 :
 1380 DEF PROCup
 1390 IF B%=-1 AND (y1+50)<895 THEN PROC
placepoint1:y1=y1+50:PROCplacepoint1
 1400 IF C%=-1 AND (y2+50)<895 THEN PROC
placepoint2:y2=y2+50:PROCplacepoint2
 1410 ENDPROC
 1420 :
 1430 DEF PROCdn
 1440 IF B%=-1 AND (y1-50)>=0 THEN PROCp
lacepoint1:y1=y1-50:PROCplacepoint1
 1450 IF C%=-1 AND (y2-50)>=0 THEN PROCp
lacepoint2:y2=y2-50:PROCplacepoint2
 1460 ENDPROC
 1470 :
 1480 DEF PROCrt
 1490 IF B%=-1 AND (x1+50)<=640 THEN PRO
Cplacepoint1:x1=x1+50:PROCplacepoint1
 1500 IF C%=-1 AND (x2+50)<=1280 THEN PR
OCplacepoint2:x2=x2+50:PROCplacepoint2
 1510 ENDPROC
 1520 :
 1530 DEF PROClt
 1540 IF B%=-1 AND (x1-50)>=0 THEN PROCp
lacepoint1:x1=x1-50:PROCplacepoint1
 1550 IF C%=-1 AND (x2-50)>=640 THEN PRO
Cplacepoint2:x2=x2-50:PROCplacepoint2
 1560 ENDPROC
 1570 :
 1580 DEF PROCplacepoints
 1590 GCOL 4,0
 1600 PROCplacepoint1
 1610 PROCplacepoint2
 1620 ENDPROC
 1630 :
 1640 DEF PROCplacepoint1
 1650 GCOL 4,0
 1660 MOVE x1+8,y1:DRAW x1-8,y1:MOVE x1,
y1+8:DRAW x1,y1-8
 1670 ENDPROC
 1680 :
 1690 DEF PROCplacepoint2
 1700 GCOL 4,0
 1710 MOVE x2+8,y2:DRAW x2-8,y2:MOVE x2,
y2+8:DRAW x2,y2-8
 1720 ENDPROC
 1730 :
 1740 DEF PROCdrawsurface
 1750 CLS:VDU 28,0,31,39,28
 1760 VDU 29,0;128;
 1770 VDU 24,0;0;1279;895;
 1780 GCOL 0,1
 1790 PROCrect(0,0,640,895,1)
 1800 VDU 19,2,4;0;
 1810 GCOL 0,2
 1820 PROCrect(641,0,639,895,1)
 1830 MOVE0,895:VDU 5
 1840 GCOL 0,3
 1850 PRINT surface1$;" ";speed1;"m/s"
 1860 MOVE 640,895:VDU 5
 1870 GCOL 0,3
 1880 PRINT surface2$;" ";speed2;"m/s"
 1890 VDU 4
 1900 ENDPROC
 1910 :
 1920 DEF PROCsurface
 1930 REPEAT
 1940 PROCbacking(CHR$133)
 1950 PROCdblht(we$+"Surfaces",3,1)
 1960 PRINTTAB(3,5);yw$"Surface 1: ";sur
face1$
 1970 PRINTTAB(26,5);"Speed: ";speed1;"
m/s"
 1980 PRINTTAB(3,7);gn$"Surface 2: ";sur
face2$
 1990 PRINTTAB(26,7);"Speed: ";speed2;"
m/s"
 2000 PRINTTAB(3,9);cn$"Is this correct?
";
 2010 an$=FNgpi(1,0,"YyNn")
 2020 IF an$="Y" OR an$="y" THEN UNTILTR
UE:ENDPROC
 2030 PRINTTAB(3,9);STRING$(17," ")
 2040 REPEAT
 2050 PRINTTAB(15,5);:dum$=FNgpi(10,0,al
l$):UNTIL dum$>CHR$64 OR dum$=""
 2060 IF dum$>CHR$64 THEN surface1$=dum$
 2070 PRINTTAB(15,5);surface1$;SPC(10-LE
Nsurface1$)
 2080 REPEAT
 2090 PRINTTAB(33,5);:dum$=FNgpi(2,0,nos
$):UNTIL dum$>"0" OR dum$=""
 2100 IF dum$>"0" THEN speed1=VALdum$
 2110 PRINTTAB(33,5);speed1;SPC(2-LEN(ST
R$(speed1)))
 2120 REPEAT
 2130 PRINTTAB(15,7);:dum$=FNgpi(10,0,al
l$):UNTIL dum$>CHR$64 OR dum$=""
 2140 IF dum$>CHR$64 THEN surface2$=dum$
 2150 PRINTTAB(15,7);surface2$;SPC(10-LE
Nsurface2$)
 2160 REPEAT
 2170 PRINTTAB(33,7);:dum$=FNgpi(2,0,nos
$):UNTIL dum$>"0" OR dum$=""
 2180 IF dum$>"0" THEN speed2=VALdum$
 2190 PRINTTAB(33,7);speed2;SPC(2-LEN(ST
R$(speed2)))
 2200 UNTIL 0
 2210 :
 2220 DEF FNok
```

Continued ▶

◀ Surface modeller continued

```
 2230 PROCdblht(we$+"Press Q to quit/C t
o continue",2,22)
 2240 REPEAT G$=GET$: UNTIL INSTR("QqCc"
,G$)
 2250 =INSTR("Qq",G$)
 2260 :
 2270 DEF FNmenu
 2280 PROCbacking(be$)
 2290 PROCdblht(cn$+"Main menu",15,1)
 2300 PROCdblht(yw$+"A:    See the notes"
,8,4)
 2310 PROCdblht(yw$+"B:    Make new surfa
ces",8,6)
 2320 PROCdblht(yw$+"C:    Move a point",
8,8)
 2330 PROCdblht(yw$+"D:    Explore",8,10)
 2340 PROCdblht(yw$+"E:    See the result
s",8,12)
 2350 PROCdblht(yw$+"F:    Start again",8
,14)
 2360 PROCdblht(yw$+"G:    Leave the prog
ram",8,16)
 2370 PROCdblht(cn$+"Which? ",8,19)
 2380 REPEAT PROCdblht(" ",16,19):REPEAT
 2390 A$=CHR$(GET AND 223)
 2400 A%=INSTR("ABCDEFG",A$)
 2410 UNTIL A%>0
 2420 PROCdblht(A$,16,19)
 2430 REPEAT
 2440 B=GET
 2450 UNTIL B=13 OR B=127
 2460 UNTIL B=13
 2470 =A%
 2480 :
 2490 DEF PROCsetup
 2500 DIM dist(50,7)
 2510 PROCvalid
 2520 rd$=CHR$129
 2530 be$=CHR$132
 2540 yw$=CHR$131
 2550 gn$=CHR$130
 2560 cn$=CHR$134
 2570 we$=CHR$135
 2580 surface1$="Concrete":speed1=2
 2590 surface2$="Grass":speed2=1
 2600 x1=140:y1=400
 2610 x2=1140:y2=400
 2620 ptr=0
 2630 combo=0
 2640 ENDPROC
 2650 :
 2660 DEF FNgpi(len,effect,valid$)
 2670 LOCAL a$,b
 2680 a$=""
 2690 PRINT STRING$(len,".");STRING$(len
,CHR$(8));:*FX15,1
 2700 b=GET:IF b=13 THEN =a$
 2710 IF b<32 THEN 2700
 2720 IF b=127 AND a$="" THEN 2700
 2730 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PR
INT CHR$b;".";CHR$(8);:GOTO 2700
 2740 IF effect=0 THEN2770
 2750 IF effect=1 b=b AND 223 ELSE b=b O
R32
 2760 IF effect=3 AND(RIGHT$(a$,1)=" " O
R a$="") b=b AND 223
 2770 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 SOUND 1,1,4,20:GOTO 2700
 2780 PRINT CHR$b;:a$=a$+CHR$b:GOTO 2700
 2790 :
 2800 DEF PROCvalid
 2810 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 2820 low$=" abcdefghijklmnopqrstuvwxyz"
 2830 nos$=".0123456789"
 2840 pun$=" -_!#$%&'()=?/*:+;.,<>"+CHR$
34
 2850 all$=nos$+cap$+low$+pun$
 2860 ENDPROC
 2870 :
 2880 DEF PROCdblht(x$,x,y)
 2890 PRINTTAB(x-1,y);CHR$(141);x$;TAB(x
-1,y+1);CHR$(141);x$
 2900 ENDPROC
 2910 :
 2920 DEF PROCspace(x$)
 2930 PRINTTAB(3,24);x$;"Press the SPACE
 BAR to continue";:*FX15,1
 2940 REPEAT UNTIL GET=32
 2950 ENDPROC
 2960 :
 2970 DEF PROCbacking(x$)
 2980 LOCAL j%
 2990 CLS:FOR j%=0 TO 24:PRINTTAB(0,j%);
x$;CHR$157;:NEXT
 3000 ENDPROC
 3010 :
 3020 DEF PROCtitle(backn$,forgn$,title$
)
 3030 PROCbacking(backn$)
 3040 title$=forgn$+title$
 3050 PROCdblht(title$,(20-LEN(title$)DI
V2),6)
 3060 PROCdblht(CHR$(131)+"A Mathematica
l Investigation",5,10)
 3070 PROCdblht(CHR$134+"Another one of
Joe's Jottings",5,18)
 3080 PROCspace(forgn$)
 3090 ENDPROC
 3100 :
 3110 DEF PROCrect(x,y,l,w,f)
 3120 MOVE x,y:DRAW x+l,y
 3130 IF f=0 DRAW x+l,y+w:DRAW x,y+w ELS
E PLOT 85,x,y+w:PLOT 85,x+l,y+w
 3140 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 3150 ENDPROC
 3160 :
 3170 DEF PROCnotes
 3180 RESTORE
 3190 REPEAT
 3200 CLS
 3210 PROCbacking(rd$)
 3220 PROCdblht(we$+"Notes:",2,0)
 3230 PRINT'
 3240 REPEAT READ A$
 3250 IF A$<>"*" AND A$<>"**" THEN:A$=yw
$+A$:PROCdblht(A$,3,VPOS)
 3260 IF A$="*" THEN PROCdblht(we$+"Pres
s SPACE to go on",10,22):REPEAT UNTIL GE
T=32
 3270 UNTIL A$="*" OR A$="**"
 3280 UNTIL A$="**"
 3290 ENDPROC
 3300 :
 3310 DATA This program lets you set up
 3320 DATA two types of surface and
 3330 DATA then a start and end point.
 3340 DATA " "
 3350 DATA You have to find the shortest
 3360 DATA time to move between the
 3370 DATA the points.
 3380 DATA *
 3390 DATA Remember that you may be able
 to
 3400 DATA run faster on one surface tha
n on
```

Continued ▶

TOP OF THE LIST

◀ Surface modeller continued

```
 3410 DATA the other.
 3420 DATA " "
 3430 DATA For example:
 3440 DATA If one surface is SAND and th
e
 3450 DATA other is TARMAC
 3460 DATA *
 3470 DATA You can also change
 3480 DATA the surfaces so you can put
 3490 DATA the results of real tests int
o
 3500 DATA the computer to make a comput
er
 3510 DATA model of a real situation.
 3520 DATA *
 3530 DATA The computer will also record
 3540 DATA the shortest time for each ru
n
 3550 DATA you make.
 3560 DATA " "
 3570 DATA You can look at these to help
 3580 DATA with decisions about the
 3590 DATA shortest timed route for any
 3600 DATA two surfaces.
 3610 DATA *,**
```

See Interlude page 147

Listing 1. Mode 7 dump

```
"7dump" [%Screen Dump for Mode 7
%Disable Shadow RAM with *SHADOW 1
9P( REP(-2 QKEY )UNTIL( IDLE )REP
"SAVE screen 7C00 8000" OSCLI
)P
]
```

Listing 2. Mode 4 dump

```
"4dump" [%Screen Dump for Staff Editor
%Disable Shadow RAM with *SHADOW 1
%Reload in Mode 4 at &5800
11 #OUT " %      " $OUT
"SAVE screen 6000 8000" OSCLI
]
```

Top of the List

Listing 1. Enhanced dump

```
   10 REM Formatted file
 viewer/dumper
   20 REM by Graham Bell
   30 REM for B/B+/M/C
   40 REM (c) BAU Februa
ry 1989
   50 :
   60 MODE 6
   70 osbyte=&FFF4
   80 oswrch=&FFEE
   90 osnewl=&FFE7
  100 osasci=&FFE3
  110 osrdch=&FFE0
  120 osfile=&FFDD
  130 osargs=&FFDA
  140 osgbpb=&FFD1
  150 osfind=&FFCE
  160 gsread=&FFC5
  170 gsinit=&FFC2
  180 fscv=&021E
  190 gspt=&F2
  200 :
  210 origin=&900
  220 buffer=&B00
  230 filptr=&A8
  240 argptr=&AC
  250 bufptr=&AC
  260 endptr=&AD
  270 valid=&AE
  280 width=&AF
  290 :
  300 code=&900
  310 FOR I%=0 TO &2FF
  320 I%?code=0
  330 NEXT
  340 :
  350 FOR pass=0 TO 3 ST
EP 3
  360 P%=origin
  370 :
  380 [OPT pass
  390 JMP entry
  400 BRK
  410 OPT FNequs("VFILE
 v1.0")
  420 BRK
  430 :
  440 .main
  450 JSR incr
  460 .loop
  470 JSR line
  480 JSR osrdch
  490 BCS rderr
  500 CMP #&8A
  510 BNE loop1
  520 JSR incr
  530 JMP loop
  540 .loop1
  550 CMP #&8B
  560 BNE loop2
  570 JSR decr
  580 JMP loop
  590 .loop2
  600 CMP #&0D
  610 BEQ exit
  620 CLC
  630 JMP loop
  640 :
  650 .rderr
  660 CMP #&1B
  670 BNE exit
  680 LDA #&7C
  690 JSR osbyte
  700 :
  710 .exit
  720 LDA #&00
  730 LDY gblock
  740 JSR osfind
  750 LDA #&04
  760 LDX cursor
  770 JSR osbyte
  780 .exit1
  790 JSR osnewl
  800 LDA #&87
  810 JSR osbyte
  820 CPX #&20
  830 BNE exit1
  840 JMP osnewl
  850 :
  860 .filbuf
  870 LDX #&FF
  880 STX gblock+3
  890 STX gblock+4
  900 INX
  910 STX gblock+5
  920 STX gblock+7
  930 STX gblock+8
  940 STX gblock+9
  950 INX
  960 STX gblock+6
  970 LDA filptr+1
  980 STA gblock+10
  990 LDA filptr+2
 1000 STA gblock+11
 1010 LDA filptr+3
 1020 STA gblock+12
 1030 LDA #buffer MOD256
 1040 STA gblock+1
 1050 LDA #buffer DIV256
 1060 STA gblock+2
 1070 LDA #&03
 1080 LDX #gblock MOD256
 1090 LDY #gblock DIV256
 1100 JSR osgbpb
 1110 ROR valid
 1120 LDA gblock+1
 1130 STA endptr
 1140 RTS
 1150 :
 1160 .incr
 1170 CLC
 1180 LDA bufptr
 1190 ADC width
 1200 BCC incr1
 1210 LDA #&01
 1220 LDX gblock
 1230 JSR osfsc
 1240 TXA
 1250 BEQ incr2
 1260 .beep
 1270 LDA #&07
 1280 JSR oswrch
 1290 CLC
 1300 RTS
 1310 .incr1
```

Continued ▶

TOP OF THE LIST

◀ **Enhanced dump continued**

```
1320 BIT valid
1330 BPL incr2
1340 CMP endptr
1350 BCS beep
1360 .incr2
1370 JSR osnewl
1380 JSR add32
1390 CLC
1400 LDA bufptr
1410 ADC width
1420 STA bufptr
1430 BCC incr4
1440 .incr3
1450 JSR filbuf
1460 .incr4
1470 SEC
1480 RTS
1490 :
1500 .osfsc
1510 JMP (fscv)
1520 :
1530 .decr
1540 LDA #&00
1550 ORA filptr
1560 ORA filptr+1
1570 ORA filptr+2
1580 ORA filptr+3
1590 BEQ beep
1600 LDA #&0B
1610 JSR oswrch
1620 LDA #&0D
1630 JSR oswrch
1640 LDA bufptr
1650 JSR sub32
1660 SEC
1670 LDA bufptr
1680 SBC width
1690 STA bufptr
1700 BCC incr3
1710 RTS
1720 :
1730 .sub32
1740 SEC
1750 LDA filptr
1760 SBC width
1770 STA filptr
1780 LDA filptr+1
1790 SBC #&00
1800 STA filptr+1
1810 LDA filptr+2
1820 SBC #&00
1830 STA filptr+2
1840 LDA filptr+3
1850 SBC #&00
1860 STA filptr+3
1870 RTS
1880 :
1890 .add32
1900 CLC
1910 LDA filptr
1920 ADC width
1930 STA filptr
1940 LDA filptr+1
1950 ADC #&00
1960 STA filptr+1
1970 LDA filptr+2
1980 ADC #&00
1990 STA filptr+2
2000 LDA filptr+3
2010 ADC #&00
2020 STA filptr+3
2030 RTS
2040 :
2050 .line
2060 BCC line9
2070 LDA filptr+1
2080 JSR phex
2090 LDA filptr
2100 JSR phex
2110 JSR space
2120 LDX width
2130 LDY bufptr
2140 .line1
2150 LDA buffer,Y
2160 BIT valid
2170 BPL line2
2180 CPY endptr
2190 BCS line3
2200 .line2
2210 JSR phex
2220 JMP line4
2230 .line3
2240 LDA #&2A
2250 JSR oswrch
2260 JSR oswrch
2270 .line4
2280 JSR space
2290 INY
2300 DEX
2310 BNE line1
2320 LDX width
2330 LDY bufptr
2340 .line5
2350 LDA buffer,Y
2360 BIT valid
2370 BPL line6
2380 CPY endptr
2390 BCC line6
2400 LDA #&2A
2410 .line6
2420 CMP #&20
2430 BCS line7
2440 LDA #&2E
2450 .line7
2460 CMP #&7F
2470 BCC line8
2480 LDA #&2E
2490 .line8
2500 JSR oswrch
2510 INY
2520 DEX
2530 BNE line5
2540 .line9
2550 RTS
2560 :
2570 .space
2580 LDA #&20
2590 JMP oswrch
2600 :
2610 .phex
2620 PHA
2630 LSR A
2640 LSR A
2650 LSR A
2660 LSR A
2670 JSR phex1
2680 PLA
2690 AND #&0F
2700 .phex1
2710 ORA #&30
2720 CMP #&3A
2730 BCC phex2
2740 ADC #&06
2750 .phex2
2760 JMP oswrch
2770 :
2780 .cursor
2790 OPT FNequb(&00)
2800 :
2810 .gblock
2820 OPT FNequb(&00)
2830 OPT FNequd(&000000
00)
2840 OPT FNequd(&000000
00)
2850 OPT FNequd(&000000
00)
2860 :
2870 .entry
2880 LDA #&00
2890 STA filptr
2900 STA filptr+1
2910 STA filptr+2
2920 STA filptr+3
2930 :
2940 LDA #&01
2950 LDX #argptr
2960 LDY #&00
2970 JSR osargs
2980 LDA argptr
2990 STA gspt
3000 LDA argptr+1
3010 STA gspt+1
3020 CLC
3030 JSR gsinit
3040 BEQ noargs
3050 :
3060 LDX #&FF
3070 .rdname
3080 INX
3090 JSR gsread
3100 STA filnam,X
3110 BCC rdname
3120 .rdnam1
3130 LDA #&0D
3140 STA filnam,X
3150 :
3160 CLC
3170 JSR gsinit
3180 BEQ readal
3190 .rdaddr
3200 JSR gsread
3210 BCS readal
3220 CMP #&30
3230 BCC badhex
3240 CMP #&3A
3250 BCC rdadd1
3260 AND #&DF
3270 SBC #&07
3280 BCC badhex
3290 CMP #&40
3300 BCS badhex
3310 .rdadd1
3320 ASL A
3330 ASL A
3340 ASL A
3350 ASL A
3360 LDX #&03
3370 .rdadd2
3380 ASL A
3390 ROL filptr
3400 ROL filptr+1
3410 ROL filptr+2
3420 ROL filptr+3
3430 BCS toobig
3440 DEX
3450 BPL rdadd2
3460 BMI rdaddr
3470 :
3480 .noargs
3490 BRK
3500 OPT FNequb(&80)
```

Continued ▶

```
3510 OPT FNequs("No arg
uments")
3520 .badhex
3530 BRK
3540 OPT FNequb(&81)
3550 OPT FNequs("Bad he
x")
3560 .toobig
3570 BRK
3580 OPT FNequb(&82)
3590 OPT FNequs("Beyond
EOF")
3600 .filerr
3610 BRK
3620 OPT FNequb(&83)
3630 OPT FNequs("File n
ot found")
3640 BRK
3650 :
3660 .readal
3670 LDA #&05
3680 LDX #fblock MOD256
3690 LDY #fblock DIV256
3700 JSR osfile
3710 TAY
3720 BEQ filerr
3730 :
3740 LDA fblock+13
3750 CMP filptr+3
3760 BCC toobig
3770 BNE cmpok
3780 LDA fblock+12
3790 CMP filptr+2
3800 BCC toobig
3810 BNE cmpok
3820 LDA fblock+11
3830 CMP filptr+1
3840 BCC toobig
3850 BNE cmpok
3860 LDA filptr
3870 CMP fblock+10
3880 BCS toobig
3890 :
3900 .cmpok
3910 LDA #&40
3920 LDX #filnam MOD256
3930 LDY #filnam DIV256
3940 JSR osfind
3950 TAY
3960 BEQ filerr
3970 STY gblock
3980 :
3990 LDA #&87
4000 JSR osbyte
4010 TYA
4020 AND #&07
4030 TAY
4040 LDA wdata,Y
4050 STA width
4060 :
4070 LDA #&0F
4080 JSR osasci
4090 LDA #&04
4100 LDX #&01
4110 JSR osbyte
4120 STX cursor
4130 :
4140 LDA #&00
4150 STA valid
4160 STA filptr
4170 SEC
4180 SBC width
4190 STA bufptr
4200 JSR sub32
4210 JMP main
4220 :
4230 .wdata
4240 OPT FNequb(&10)
4250 OPT FNequb(&08)
4260 OPT FNequb(&02)
4270 OPT FNequb(&10)
4280 OPT FNequb(&08)
4290 OPT FNequb(&02)
4300 OPT FNequb(&08)
4310 OPT FNequb(&08)
4320 :
4330 .fblock
4340 OPT FNequw(filnam)
4350 OPT FNequd(&000000
00)
4360 OPT FNequd(&000000
00)
4370 OPT FNequd(&000000
00)
4380 OPT FNequd(&000000
00)
4390 :
4400 .filnam
4410 :
4420 ]
4430 :
4440 NEXT
4450 PROCchecksum
4460 PROCoscli("save VF
ILE "+STR$~code+" +300 F
FFF0900 FFFF0900")
4470 END
4480 :
4490 DEF FNequb(b%)
4500 ?P%=b%
4510 P%=P%+1
4520 =pass
4530 :
4540 DEF FNequw(b%)
4550 ?P%=b% MOD 256
4560 P%?1=b% DIV 256
4570 P%=P%+2
4580 =pass
4590 :
4600 DEF FNequd(b%)
4610 !P%=b%
4620 P%=P%+4
4630 =pass
4640 :
4650 DEF FNequs(b$)
4660 $P%=b$
4670 P%=P%+LEN(b$)
4680 =pass
4690 :
4700 DEF PROCoscli(stri
ng$)
4710 DIM X% &FF
4720 Y%=X% DIV 256
4730 $X%=string$
4740 CALL &FFF7
4750 ENDPROC
4760 :
4770 DEF PROCchecksum
4780 C=0
4790 FOR I%=code TO cod
e+&2D0
4800 C=C+?(I%)
4810 NEXT I%
4820 IF C<>81857 THEN P
RINT "Check listing.":EN
D
4830 ENDPROC
```

Extensions to *DUMP

Vfile is a small utility that you can almost certainly do without. But if you're a programmer and you type it in, you'll wonder how you managed without it.

*It performs almost exactly the same function as *DUMP, with a couple of very useful extensions. First you can start to dump a file either from the beginning, or from any point within the file. Second, you can make the file scroll backwards, towards the beginning, as well as letting it scroll towards the end of the file. You can use the cursor keys to step forwards and backwards, to inspect any part of the file, and pressing Escape or Return leaves the utility and returns you to whatever you were doing.*

To inspect a file called TEMP, when the part you want is some 8k into the file, you can type:

**VFILE TEMP 2000*

*The 16 bytes of the file from &2000 to &2010 are displayed on the screen in hex, together with their ASCII equivalents. This is the same format that *DUMP uses; to the left is the file pointer value (PTR# in Basic) which tells you how far through the file you have gone. In 40 column modes, fewer bytes are displayed across the screen, so that the table maintains its neat appearance. Now you can press the up or down cursor keys to scroll through the file. Press Return when you have finished and the prompt will return a couple of lines below the bottom part of the file dump.*

TOP OF THE LIST

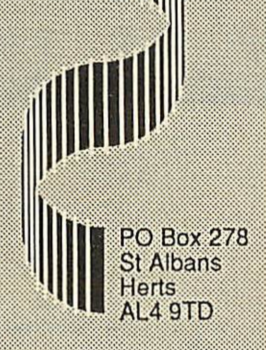
```
10 REM Mode 2 LaserJet dump
20 REM by Dave Lawrence
30 REM for B/B+/M/C
40 REM (c) BAU February 1989
50 :
60 MODE2
70 PROCdump
80 END
90 :
100 DEF PROCdump
110 base=&70:x=&72:peek=&73
120 alter=&75:times4=&77:y=&78
130 flag=&79:byte=&7A
140 val=&7B:double=&7C
150 oswrch=&FFEE
160 FOR I%=0 TO 2 STEP 2:P%=&900
170 [OPT I%
180 .dump
190 LDA #2
200 JSR oswrch
210 LDY #0
220 STY flag
230 JSR send
240 LDA #&78
250 STA base
260 LDA #&32
270 STA base+1
280 LDA #80
290 STA x
300 .xloop
310 LDA #1
320 STA alter
330 .mloop
340 LDA #1
350 STA double
360 .dloop
370 LDA #4
380 STA times4
390 .tloop
400 LDA base
410 STA peek
420 LDA base+1
430 STA peek+1
440 LDY #line-init
450 JSR send
460 LDA #32
470 STA y
480 .yloop
490 LDY #0
500 .lloop
510 LDA (peek),Y
520 STA val
530 LDA alter
540 PHP
550 LDA #0
560 LDX #4
570 PLP
580 BNE nolsr
590 .lsrloop
600 LSR val
610 .nolsr
620 LSR val
630 ROR A
640 DEX
650 BNE lsrloop
660 LSR A:LSR A:LSR A:LSR A
670 \AND #7
680 TAX
690 LDA &36F,X
700 ASL A
710 TAX
720 LDA times4
730 CMP #2
740 BCC lowbits
750 INX
760 .lowbits
770 LDA scales,X
780 PHA
790 LDA times4
800 LSR A
810 BCC highs
820 PLA
830 AND #&F
840 JMP phew
850 .highs
860 PLA
870 LSR A:LSR A:LSR A:LSR A
880 .phew
890 JSR nibble
900 INY
910 CPY #8
920 BNE lloop
930 LDA peek
940 CLC
950 ADC #&80
960 STA peek
970 LDA peek+1
980 ADC #2
990 STA peek+1
1000 DEC y
1010 BNE yloop
1020 DEC times4
1030 BNE tloop
1040 DEC double
1050 BPL dloop
1060 LDA alter
1070 EOR #1
1080 STA alter
1090 BEQ mloop
1100 LDA base
1110 SEC
1120 SBC #8
1130 STA base
1140 LDA base+1
1150 SBC #0
1160 STA base+1
1170 DEC x
1180 BEQ finish
1190 JMP xloop
1200 .finish
1210 LDY #done-init
1220 JSR send
1230 LDA #3
1240 JSR oswrch
1250 RTS
1260 :
1270 .nibble
1280 PHA
1290 LDA flag
1300 EOR #1
1310 STA flag
1320 PLA
1330 LDX flag
1340 BEQ sendit
1350 ASL A:ASL A:ASL A:ASL A
1360 STA byte
1370 RTS
1380 .sendit
1390 ORA byte
1400 .char
1410 PHA
1420 LDA #1
1430 JSR oswrch
1440 PLA
1450 JMP oswrch
1460 :
1470 .send
1480 LDA str,Y
1490 BEQ sent
1500 JSR char
1510 INY
1520 BNE send
1530 .sent
1540 RTS
1550 :
1560 :
1570 .str
1580 .init
1590 EQUS CHR$27+"E"+CHR$27+"*t300R"+CHR$27+"*r1A"+CHR$0
1600 :
1610 .line
1620 EQUS CHR$27+"*b128W"+CHR$0
1630 :
1640 .done
1650 EQUS CHR$27+"*rB"+CHR$12+CHR$0
1660 :
1670 .scales
1680 OPT FNbin("1111111111111111")
1690 OPT FNbin("1011011011011010")
1700 OPT FNbin("0100100100100101")
1710 OPT FNbin("0000010000000001")
1720 OPT FNbin("0111111111011111")
1730 OPT FNbin("0101101001011010")
1740 OPT FNbin("0100000101000001")
1750 OPT FNbin("0000000000000000")
1760 ]
1770 NEXT
1780 ENDPROC
1790 :
1800 DEF FNbin(b$)
1810 t=0
1820 FOR p%=1 TO 16
1830 t=t+(2^(16-p%))*VALMID$(b$,p%,1)
1840 NEXT
1850 [OPT I%
1860 EQUW t
1870 ]
1880 =I%
```

Mode 2 LaserJet dump

This program allows you to dump a Mode 2 screen on any printer that has Hewlett Packard LaserJet emulation built in. This includes the Qume Crystal-Print and the HP DeskJet reviewed on pages 129-133. You may also like to note that there was a mode 1 screen-dump (for HP LaserJet compatibles) published in the Yellow Pages in the November 1988 issue of Acorn User.

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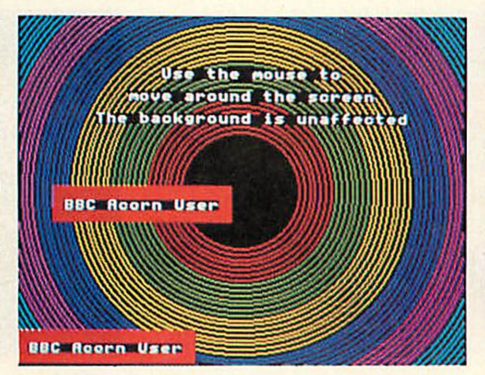
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THIS MONTH'S LISTINGS

February's listings contain many new demonstrations, programs and routines to help you use the *View* family.

From Hints and Tips this month there is an explanation file for printing labels in *View*, a prefix command for *ViewStore* which also gives the same facility in *ViewSheet*, another *View* family utility allows you to move between the various packages while the file you are working with is automatically saved; a utility to list files that have been opened; a program to scale and rotate spooled graphics.



In Arc Agora there is a screen dump for both 8 and 24-pin printers, a demonstration on using sprites and a fast circle plotter. Joe's Jottings work out the shortest distance between two points.

For buyers of the 3.5-inch disc there is the last part of the GKS listings. The 3.5-inch disc costs £6.95 and the 5.25-inch disc is £5.95.

Dispel the winter blues with February's listings

GAMES DISC

Ten of the best *Acorn User* games on one 80-track double-sided 5.25-inch disc.

Whether you're into arcade or adventure type games this new disc has something for everyone. The games included are *Warlord, Wizalon, Castle of Nightmares, Run Silent, Run Deep, Polyominoes* and *Quadline*. We have also included three of the most popular one-line games from recent Abusers. Test your knowledge with *Mastermind* and start playing *Varpon* and *Lurch* to win.

Make sure you get your disc of fun and entertainment and send off for the Games disc today. At only £8.95 it will make the perfect Christmas gift.

Games galore for just £8.95



'87 COMPILATION DISC

Acorn User has put all your favourite programs, routines and utilities from 1987 on one disc.

Featured are: Kiddie Art; Tapestry; PCB by CAD; Autumn and Theme, our music programs from April '87. Also featuring on the disc is Joe Telford's GEM-like front end for the Master including a desktop calendar and year planner.

Other useful utilities include a proportional screen dump, a *View* printer driver generator, a monitor-testing routine and a routine for printing spreadsheets sideways.



The second half of the disc is devoted to graphics, with a video image enhancer and six of the best Graphics Bonuses.

The *Acorn User* '87 Compilation disc comes in 5.25-inch 80-track format, with a comprehensive manual which includes all function key strips and instructions needed for the programs.

All the very best of '87 on one disc

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SOFTWARE & GRAPHICS



Great graphics utilities

The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 stand-alone machine code utilities, an advanced teletext editor, several useful Basic procedures, an easy-to-adapt disc header and index. Included are: *ROTATE, rotates area through 180 degrees; *SWAPCOL, swaps two colours; *COLFILL, a colour-fill routine; *SVPIC, saves a compacted picture; *LDPIC, reloads a compacted picture. There are many utilities to manipulate graphics.



Sideways RAM made simple

The *Acorn User* sideways RAM disc gives you many more utilities for your sideways RAM. These include: RAMpad – your computer's answer to the pad and pen; six different on-screen fonts available in all modes; a 15k printer buffer; Screen Swap – store and recall mode 4 or 5 screens; *ROMHEAD – standard service ROM header; *RLOOK – allows you to examine sideways RAM or ROM.

There are many more utilities on this 40/80-track 5.25-inch disc and it's a snip at £9.95.



Micro masterpieces on Portfolio for £9.95

Jonathan Inglis, freelance illustrator, has assembled a *Portfolio* of his best work exclusively for *Acorn User*.

The disc contains screens that have been used by national and regional publications. Included are Seurat's *Bathers*, a *Time Out* cover from August 1985, and two familiar *Acorn User* covers, Willow (Nov '86) and Magician (Jan '86), as well as several pictures commissioned by *The Times*.

Three of Jonathan's favourite masterpieces are on the disc; Seurat's *Riverside*, Vermeer's *Lady at the Virginal* and a copy of a famous lithograph by Matisse. Sade fans will probably be more interested in the two stunning portraits of the singer included on the disc.

You can create your own *pièce de résistance* using the Pixel Editor and Super Painter programs. Pixel Editor allows you to draw in and alter minute detail, while Super Painter enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

Portfolio comes in 80-track 5.25-inch format with a comprehensive instruction sheet telling you about the pictures and how the artist created them. This disc can be yours for only £9.95.

TO ORDER USE THE FORM ON PAGE 116

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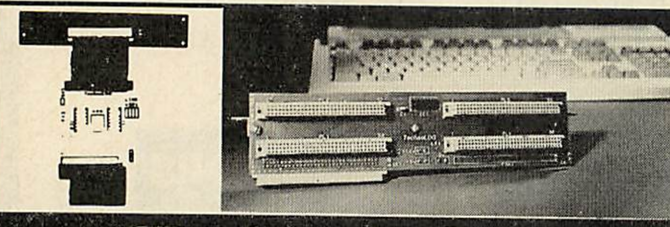
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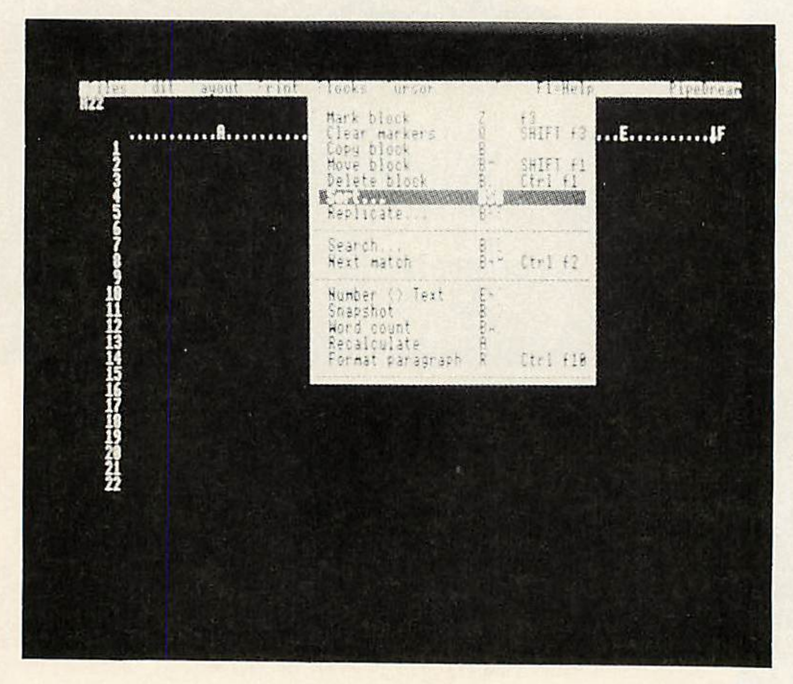


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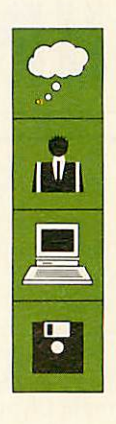
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REVIEWS

THE GAMES PAGE

MIXTURE AS BEFORE

Sam Greenhill emerges blinking into 1989 and finds that nothing much has changed: forthcoming 'new' releases are mostly sequels, compilations or conversions of old favourites

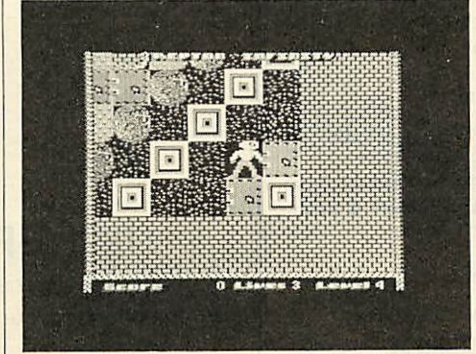
This month I can quite safely report that nothing has happened on the games scene. The Christmas market has come and gone, and most of the games companies have fed the reindeer and fallen into a slump onto the nearest available armchair. Only Sam is still at it, compiling the *Play it Again Sam* series; at present Superior has compilations planned up to the number 10 mark!

In another department at Superior, a sequel to *Barbarian* is on the cards. A conversion of *Barbarian 2* from the Commodore 64 will feature new adversaries, new monsters and more scenarios to battle in, including some cave complexes.

I've mentioned an Archimedes version of *Repton 3* before – it will provide access to 144 screens from *Around the World, Life of Repton* and *Repton Thru Time,* plus the 24 from *Repton 3* itself. The conversion has been done by John Wallis, who says he's grown tired of the familiar password system. John claims he enjoys the puzzles more than anything else in *Repton,* and so there's a 'save' option in the conversion to bypass the hassle and get down to the nitty-gritty.

Other than that, there's no real change from the BBC version. This means that we are not going to see a 'proper' demonstration of Archimedes power by the lizard – just a lizard who avoids boulders quicker. However, there will be an option to choose between four different tunes, and the full range of Arc colours will be available.

The long-promised *One Night in Bangkok* is expected soon. Superior has postponed the game so as to have something to fill the post-holiday lull. The game is based on the West End musical *Chess,* and is set on a chess board with a three-dimensional Ultimate-style view. *Bangkok* obeys the rules of chess at all times, there are dangerous pieces roaming around ready to 'take' you if you move to the wrong square, and puzzles to solve. Superior has the rights to two of the songs from the show, so they'll be used as background music.



Repton Infinity: Now available from Superior

I've been sent some hints for Superior's *Fair Means or Foul* boxing game by J Robbins of Stafford. He or she (the letter doesn't specify) starts off by moving to the ropes as soon as the bell goes. Then, when the computer's boxer comes within kicking range, he gets a kick to the groin. If he tries to dodge the kick, a headbutt puts him back in the correct position for another try. Usually the ref fails to spot the dodgy tactics. J Robbins claims to have made it to world championship status using this method, but failed to win the match because the ref finally spotted the unruly behaviour.

Rainbird, part of British Telecomsoft, may have a lot to offer the Acorn market in the near future, in particular the Arc market. But only with your help. If you have an Arc, then it's vital that you make a purchase of *Corruption,* the yuppie adventure recently voted 'Game of the Year' at the PC show. The rules are simple – if it sells well then Magnetic Scrolls, who wrote the game, will open the bow doors and convert most of their other games, otherwise...

In the BBC range Telecomsoft is best known for the wonderful *Sentinel* and the nearly wonderful *Cholo* – I still haven't seen a copy that works on an 80-track disc drive. Both of these were on the old Firebird label. Rainbird has brought out a compilation of what you might call 'black and white' oldies. *Video Games* will feature six of the original Seventies-vintage video games that involved block-graphical bats and square balls. Among the six, *Squash, Asteroids, Table Tennis* and *Tennis* will all be converted from black and white to colour – and perhaps even circular balls! Curiosity value only.

Next year the company is aiming for a bigger slice of the BBC market, with ambitious plans for a number of releases, one of which is a sports simulation. Rainbird is at pains to deny any resemblance to any of Tynesoft's simulations.

Impact, software outgrowth from the Impact Games Club, is working on quite a few games to follow *Clogger* and *Quazer.* It's also examining games software from anyone who would like to write. Four or five programs are in the pipeline at the moment.

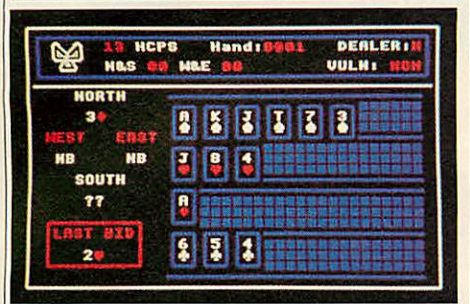
Level Nine, not content with releasing *Lancelot* and *Time and Magik* through Mandarin, has also re-entered the fray on its own account. Two recent packages are *Gnome Ranger* and *Ingrid's Back,* two adventures starring the hideous gnome Ingrid Bottomlow. Ingrid will be returning in *Gnome Free* later in the year, but before then we'll see *Spook,* a game where you – as a ghost – have to search for your own murderer.

If you have any hints or cheats for use with BBC games then please send them in. Also high scores are most welcome – *if* you can prove them.

REVIEWS

GAMES

BRIDGE BUILDING



Colossus Bridge; CDS; BBC B, B+, Master, Electron; cassette £11.99, 5.25-inch disc £14.99.

You may recall the previous offering from CDS Software, *Colossus Chess* – a classy package full of extra niceties and added functions that were easy to use. This package has all the hallmarks of being as prolific as its predecessor.

Not being a great bridge player myself, I enrolled the efforts of the Radley College Bridge Society (a powerful lobby here) to help provide a view of the package from two different angles: beginner and experienced. From the beginner's viewpoint (ie myself) it is a wonderfully easy way of learning, coming complete with a book entitled *Begin Bridge* and a computerised tutor built into the package. The book is simple, easy to read, and explains everything in a very clear and concise way.

The actual game itself is extremely complex and allows you many useful functions. These include allowing the computer to play your hand for a turn, recommend a card for you to play, and rebid or replay. Only one person is allowed to play it at a time (you are always playing South) and the computer controls the other three hands at great speed. The time delay between each play is controllable, and this is an added bonus for beginners like me because the computer plays much too quickly to keep track of it. I have been persuaded that the computer can accept the Blackwood, Stayman and Baron conventions, and I am quite happy to accept this fact, although I haven't got even the faintest idea of what they mean.

The graphics are large, making it easy on the eyes during a long session of learning, and shows everything very clearly. The packaging leaves a lot to be desired, but this small niggle should not put you off what is essentially an extremely good piece of software which should be of value to any bridge player, beginner or expert.

James Niesewand

GIVING US THE WINK

Zenon; Impact Software; BBC B, B+, Master, Electron; cassette £4.95, 5.25-inch disc £4.99.

Zenon is set in a mysterious and dangerous land where only the most heroic and foolish explorers dare to tread. It begins with your intergalactic cruiser beaming you down via a field of glittering particles and arming your Repeat Laser. The Laser is a very limited weapon, so one of your first tasks is to collect additional fire-power.

The game scrolls horizontally and has the facility for two players to battle it out together. The ultimate objective is to get to the heart of the planet Zenon and see what's there. Unfortunately the keys aren't definable but this is no particular problem as the predefined selections are reasonably sensible and joysticks are on offer for either or both players.

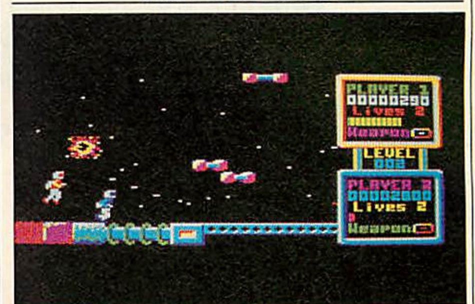
There are a number of alien species to combat against. They include snake-like androids, and large steel eyes – which wink! There are 250 levels to complete – each one more difficult than the last. Four lives per player are provided, and during the first few seconds of each new incarnation you are immune to the perils around you – a nice alternative to starting back at the beginning!

One thing I found strange: after my four lives had been taken and the Game Over message displayed I always started a new game where the old one left off. Bug or feature?

This game definitely comes into the category of hasty final touches. While it can provide amusement for a certain amount of time, *Zenon* doesn't exactly bristle with innovation. It looks good – but eyes can be deceptive.

Sam Greenhill

AWAY WITH THE JET SET



Jet Fighter; Minerva Systems; Archimedes; 3.5-inch disc £14.95.

Anyone who has owned a Spectrum is likely to have *Jet Pack*, a two-dimensional space game, *Jet Fighter* is the new version, available exclusively for the Archimedes. You play the role of a lost space man in his quest to reach higher levels. Armed with a laser and a jet-powered backpack you must first build yourself a rocket.

The setting for level one is a planet whose atmosphere covers roughly nine screens. The ground is covered with mountains, lakes, palm trees and cacti, and it's inhabited by many weird creatures, and falling 3.5-inch discs. Okay, so the game isn't as logical as some.

There are various platforms floating in space on which – on the first level – pieces of rocket can be found. Pick them up and fly over the rocket assembly base, and the pieces float gently down to become a rocket. Once this is done, you must collect fuel; then the rocket is ready for action. Climb on board and take your seat (or rather stand up with your stomach held in) and away you go to the next planet.

Your jet fighter is controlled entirely by mouse – and there's a built-in hint routine activated by the middle button. There are many different nasties to shoot, and bonuses to collect. The sprites are nicely detailed, the action is smooth and the control is very easy. But... once again, this is all that's on offer. It's typical of Minerva to make the objective virtually impossible *not* to achieve. The idea of a built-in 'hinter' makes the whole thing too easy. Unfortunately this game must take the thumbs down.

Sam Greenhill

Crisp Printing

Now here's some food for thought ... The Micro P. range of dot matrix printers offers crisp printing performance at unbelievably competitive prices and is ideal for cost conscious users with a real appetite for work.

There is a whole range to choose from to suit all tastes, ranging from the snappy 135cps MP135+, the 240cps MP200+, pictured above, with optional font cards, through to the gluttonous line printer, the 700cps MP700.

Whilst we won't promise to include a little blue bag of salt, the Micro P. range of printers will produce some very appetising printout, at prices any user will relish!



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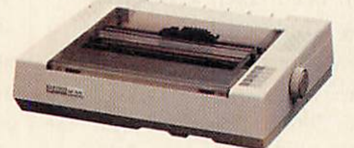
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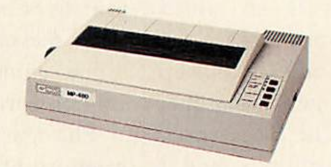
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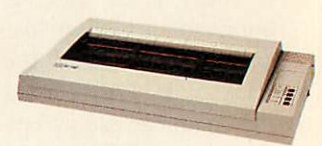
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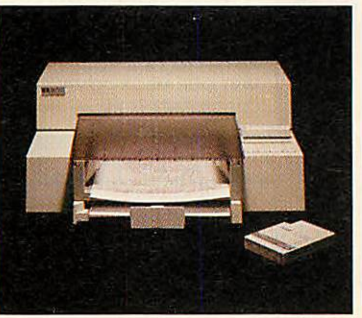
THE PRINTING BEST

Some alternative technology has arrived on the printer market. Malcolm Brown discovers two machines he considers worth a look

To most computer users, a printer is either a dot-matrix or daisywheel type. The pros and cons of each are well known, and are summarised at the end of the article: daisywheel machines are slow but produce a quality of print-out indistinguishable from that of a typewriter, while dot-matrix printers are fast, although even the best NLQ is easily recognised as computer-generated. Of course laser printers are the upwardly mobile alternative today. However, costing anything from as much as £1700 apiece, few BBC micro users are in a position to consider them a viable option – except of course on a network, where the costs can be shared between several users.

Lurking in the side wings is a wide range of alternative printer technologies which rarely get the attention they deserve. Two recent arrivals which cannot be neatly categorised as 'daisywheel', 'dot-matrix' or 'laser' are the Deskjet from Hewlett Packard and the Crystal Print from Qume.

Technically, both these printers are, in fact, dot-matrix – that is, they produce characters on paper built up from an array of individually printed dots. But 'dot-matrix' these days is used almost exclusively to refer to *impact* dot-matrix printers – the old reliable Epsons and Taxans which use a line of pins hammering through an inked ribbon to produce the dots on the paper.





Left: Hewlett Packard's Deskjet, an ink-jet printer with a difference, while Qume's Crystal Print works like a laser printer

Hewlett Packard Deskjet

The Deskjet looks unlike any normal printer that's likely to grace the desk alongside a BBC micro. Its price, too, is different from most other models. At a typical cost of £875, you would expect a superb printer for your money. Fortunately the Deskjet can deliver the goods, and provides most of the facilities of laser printers costing three times as much. The Deskjet is an ink-jet printer. This essentially means that it squirts a jet of ink at the paper in order to produce each dot. This sounds simple enough, but several manufacturers, Hewlett Packard and Canon among them, have spent many years and much money researching into this method of printing. The Deskjet could be considered (for this price, at least) to represent the culmination of all this work.

Most older printers, such as the Epson FX80, use nine pins in their printhead in a single column, giving characters in a 11 x 9 dot array, with each dot about a third of a millimetre across. Newer and more expensive dot-matrix printers, such as the Panasonic KX-P1124 reviewed last month, use 24 pins in two columns of 12, to produce characters of about 30 x 24. The slightly smaller dots are also overlapped, by virtue of the two columns of pins, and this contributes to an even better image.

The Hewlett Packard Deskjet produces characters on a 30 x 56 dot matrix, so each dot is far too small to make any kind of accurate measurement. The Deskjet can manage this because it has no less than 56 separate ink nozzles in its printhead, each acting much like a pin in an impact printer. What's more, adjacent nozzles can squirt ink at the same time to produce overlapping dots, without worrying about any pins hitting each other as they might with real metal pins. This means the system is potentially faster too. The ink is squirted from the nozzles by vaporising a small quantity of it inside a chamber behind each nozzle, using tiny heaters. The expansion of the ink as it turns to vapour forces it (liquid and gas) out through a pipe aimed squarely at the paper. Because there are no hammers constantly striking the paper, ink-jet printers are extremely quiet. There are no worries over the wear on pins or their snagging on the paper as the printhead passes, so ink-jet printers can obviously move across the paper much faster.

When the ink hits the paper, it dries almost immediately as there is such a small quantity deposited. In this way tiny, precise dots are produced on the paper almost instantly, with just an electrical signal to the heaters and no moving parts except the movement of the printhead across the paper.

That's the theory. With previous ink-jet models, like the familiar Integrex colour printer, it is a tried and trusted printing technique. The Deskjet also achieves excellent results in practice.

Setting up is simple. The Deskjet has its own separate power supply box, and both serial and parallel ports. There are a few DIP switches to set, but the manual covers these clearly, and there's a handy *aide-mémoire* on the printer cover.

The Deskjet doesn't just print in a different way from other machines. It even operates differently. It's more like a photocopier to use. It can't take fanfold paper – only cut sheets – but it is loaded completely automatically. A ream of paper is placed on the in tray, and as each sheet is required, it's fed in. When printed, it's deposited by an ingenious collection of rollers and levers in a neat heap in the out tray.

The whole mechanism is delightfully reminiscent of Heath Robinson, but also

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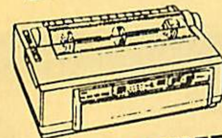
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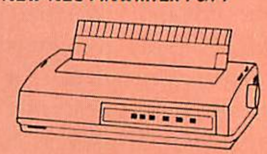
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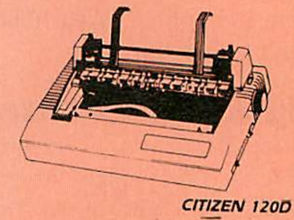
CITIZEN HQ P40 ..... **350.00**
80 column. 24 pin. Dual interface.

Colour Option	50.00
Colour Ribbon	20.00

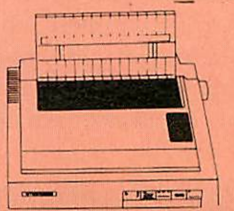
CITIZEN HQ P45 ..... **310.00**
136 column. 24 pin. Dual interface.

NEW
CITIZEN 180E ***169.00***
175cps Draft Elite
30 NLQ. 4k Buffer.
2 year warranty.

PRINTERS



CITIZEN 120D



CITIZEN HQP40

Liquid crystal sh
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does not slow dow
Crystalprint as i
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paper.

The ink is squirted from the nozzles by vaporising a small quantity of it inside a chamber behind each nozzle using tiny heaters. The expansion of the ink as it turns to vapour forces it (liquid and gas) out through the nozzle aimed squarely at the paper.

Because there are no hammers constantly striking the paper, ink jet printers are extremely quiet too. Because there are no worries over the wear on pins or their snagging on the paper as the printhead passes, ink jet printers can move across the paper much faster.

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Top examples show the quality of the built-in courier font in the Qume Crystal Print (left) and Hewlett Packard Deskjet, both examples are shown double size. Lower boxes show the clarity of the Deskjet's optional Helvetica and Times fonts

a little 'plastic' looking. The whole machine does not look up to very heavy use. But the feed mechanism is incredibly accurate. Putting it to the test by printing on the same paper twice produces print so well aligned, it's difficult to discern a double impression. There's even a special facility for dealing with awkward items like envelopes. It couldn't be easier.

There are two qualities of print – draft and letter quality. The draft mode print is better than some printers' NLQ attempts. The characters are styled like a typewriter's but they're still clearly made up of dots. In high quality mode, the Deskjet produces print-out which is clear, crisp and dark. It is really quite difficult to distinguish from typed, laser-printed or even typeset material. And it does all this in almost total silence. The 56 nozzles enable the Deskjet to print 300 dots per inch – a resolution equal to most laser printers. Because it's a dot-matrix printer, the Deskjet also has the ability to produce graphics and a wide variety of print sizes and effects.

However, there are problems. One minor one is that with cheap, thin paper the liquid ink leaves the paper slightly damp and crinkly. This is particularly apparent when you're producing graphics or large letters with areas of solid black. More expensive coated paper, rather than normal cartridge paper, works best with the Deskjet. But the manual is very clear on this point, and even points out there is a right way up for paper – it isn't the same on both sides.

Another quibble is that, like other ink-jet systems, the Deskjet cannot produce multiple copies with carbon paper, as there is no impact on the paper to imprint the copy.

The ink supply is contained within the printhead, in a removable reservoir. This also contains the ink nozzles. You throw the whole thing away when the ink runs out, and slot another one into place. This is relatively expensive at £16 a time – but as the cartridges last for about half a million characters and the replacement operation is much easier and cleaner than replacing most printer ribbons, the expense can be forgiven.

The Deskjet also lives up to the ink-jet system's promise of speed. Hewlett Packard claims a speed for this machine of 240CPS in draft mode and 120CPS in high quality mode. In reality, of course the actual speeds are much less – about half those – and although the Deskjet cannot compete on speed with a laser printer, it compares well with 24-pin impact printers which can cost anything up to £1000.

Like all printers, the Deskjet needs codes sent from the computer to tell it what to do. Unfortunately the codes used in this machine are unlike any most Beeb owners will have seen. The Deskjet uses Hewlett Packard's own 'Laserjet' code system used in many non-PostScript laser printers. These are complex, to say the least, requiring four or five codes to be transmitted for every operation. Although the Beeb can happily produce such codes, some printer driver generator software will not cope with (say) underline commands of more than two codes long.

Graphics dumps produced on this machine are truly wonderful. However, BBC micro Laserjet-compatible dumps are rare, though a dump for mode 1 was published in *Acorn User* in November 1988, and if you have an Archimedes, *ProArtisan* contains a Laserjet dump. The November *Acorn User* Laserjet dump is included on this month's disc as a bonus. You may have to write your own software to use the machine to the full. However, there is an Epson compatibility cartridge available and this is almost essential for Beeb owners. But it will set you back a further £76, and it doesn't support all the potential features of the printer – only those used by Epson printers.

The basic Deskjet is not capable of many character types, and cannot produce italics or proportional spacing. Other cartridges are also available to give further fonts and other character sizes and styles. All the extra cartridges cost £76 a time and most give a couple of fonts in about four sizes – for example, Helvetica and Helvetica Italic in 4, 5, 8 and 10 point. Cartridges for foreign and mathematical symbols are also available. You can download new fonts from disc, but there is no BBC software to allow you to do this. Note the download font format isn't the same as the Hewlett Packard Laser printers.

Finally, the Deskjet stacks printed paper in reverse order once it's printed; you have to re-sort everything by hand. However, for a machine costing under

£1000 with print quality matching a laser printer, the Deskjet can offer an attractive alternative.

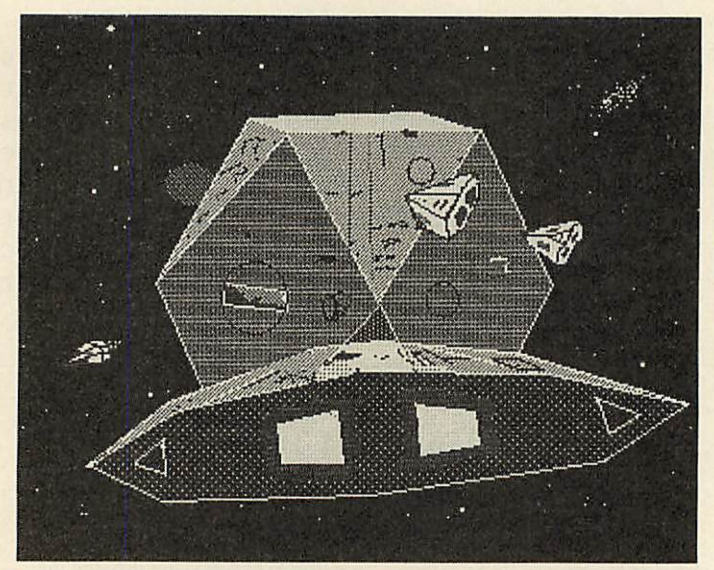
Qume Crystal Print

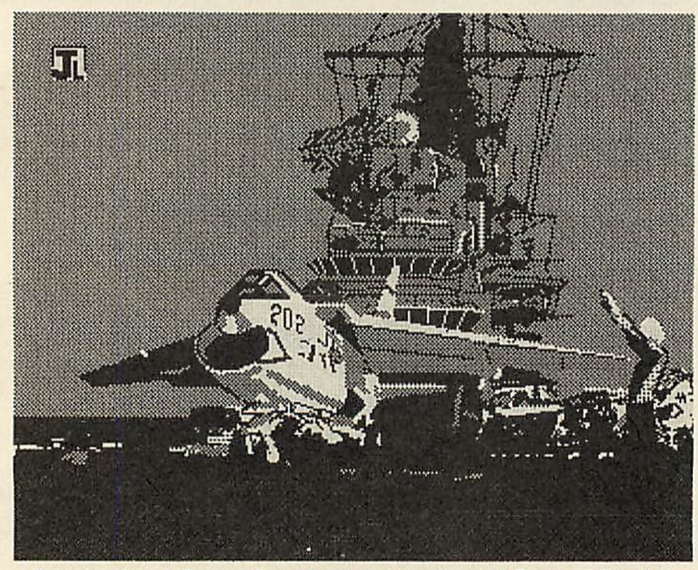
Although laser printer prices are falling all the time, there is a minimum price for this technology caused by the inherently complex printing mechanism it uses.

Like photocopiers, laser printers too are based on xerography. First of all, a special rotating drum is electrostatically charged, then it's scanned by a small laser beam deflected back and forth across it by a rotating mirror. Where the light beam hits the drum it loses its charge. By switching the laser beam on and off under the control of the printer's built-in computer, an 'image' of charge is built up on the drum – in the same way that an image is built up on a TV screen.

Black toner powder is then liberally scattered on the drum, and it sticks only to those parts still charged. Finally, paper is rolled around the drum, picking up the toner pattern which is then 'fixed' to the paper with heat.

The Crystal Print uses much of the laser printer's xerography technology, but it leaves out the expensive, fragile and wearable laser and scanning mechanism. Instead it uses a constant source of light (a simple halogen lamp) shone through a thin strip of liquid crystal. Just as the liquid crystal display on a digital watch can be turned light or dark in parts under electronic control, so the liquid crystal shutter in the Crystal Print allows each line of the charged drum to be exposed to the light under the control of the printer's computer. Watch displays have seven segments on each numeral, whereas the Crystal Print has about 2500 segments in a single strip. This 'exposes' a line across the drum just as a single pass of the laser beam would. Liquid crystal shutters are slow compared to laser beams. It takes a while (still only a fraction of a second) for the crystal to darken or clear. However, this does not slow down the Crystal Print at all, as a complete line is exposed at once: there is no scanning from side to side.





Both the Qume Crystal Print (top) and the Hewlett Packard Deskjet emulate HP Laserjet graphics – using screen dump software from Top of the List, *Acorn User*, November 1988. Note the density of black on both and the slight bonding on the Deskjet dump

The quality of print from the Crystal Print is as good as from any laser printer. The 2500 tiny segments allow 300 dots to the inch, giving text which is beautifully crisp and clear, and very difficult to tell from typeset or typewritten.

Like the Deskjet, the Crystal Print uses only cut sheet paper. This is loaded 100 sheets at a time into a tray slotted into the front of the machine. The printed paper emerges from the top with the printed side downwards, in order. This arrangement is much better than that found in most laser printers which have in and out trays jutting out the side. The Crystal Print is much more compact, though it isn't as quiet as other laser printers (or even the Deskjet).

There are two versions of the Crystal Print available. The WP version costs typically about £900, but has just one character size and style built-in, and only 128k of memory. This means it can't do sensible graphics. It emulates only a Diablo 630 printer (a standard daisywheel). The Series II version which was supplied for review costs around £1400 in the shops and comes with 512k of RAM – enough for graphics like a full page screen dump – and like the Deskjet, it emulates the Hewlett Packard Laserjet II printers.

The basic Series II machine can print two styles of character at one size each: a 'Courier' typewriter look-alike at 10 characters per inch, and a 'Lineprinter' dot-matrix-looking font at 16 characters per inch. Courier is available in bold as well. All the fonts contain all the normal characters plus as many foreign and graphics symbols as anyone is likely to want. In addition, text can be automatically printed sideways to use the paper horizontally.

Many more fonts are available on cartridge (but they cost about £90 each), or they can be downloaded into the printer's memory. But the format for downloading fonts is anything but simple, and no software for this is available on the BBC micro. However, Archimedes and Master 512 users do have access to the wide range of IBM PC-compatible

font software – which is normally used for Hewlett Packard-style laser printers.

Perhaps the most attractive use of the Crystal Print is for graphics. Like the Deskjet, the lack of software that's able to cope with the HP codes is a problem. Fortunately, an Epson emulation card is available for this machine for £125, and this should be considered essential by most Beeb users.

Persevering with the difficult Laserjet codes is worthwhile, however, as some really impressive graphics are possible. Even an Epson emulated screen dump is impressive – the blacks are solid black and the edges of each pixel sharp and square – but any program using the machine to its full potential produces immaculate results.

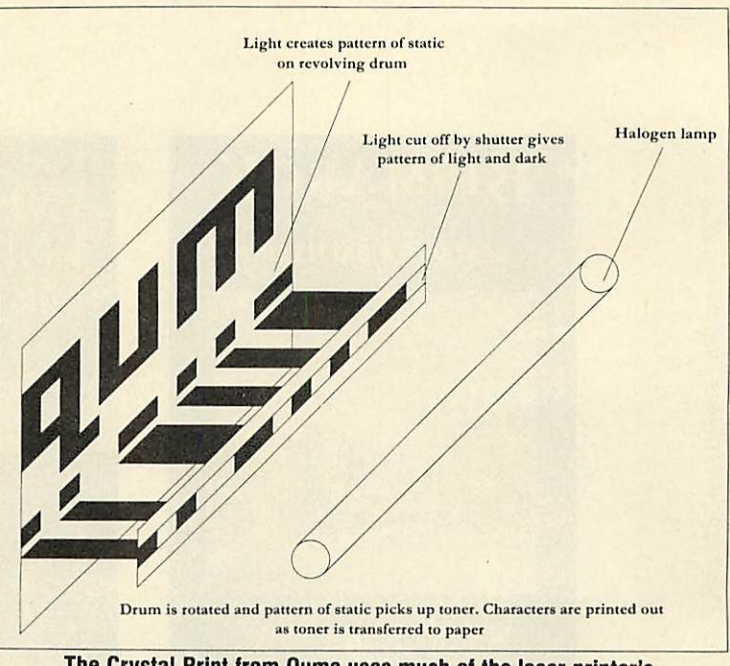
There is a price to pay for all this resolution and quality. Like a laser printer, the Crystal Print is both difficult to set up and expensive to run. There's plenty of messing around with toner (£58 for enough to do about 6000 pages) and you'll need a new drum after about 10,000 pages (that will set you back £85). Just like a photocopier, the paper can get jammed up every so often in the tortuously complex mechanism. All in all it works out to about 4p for each and every page, and with all the difficult codes (and the sheer fun of playing with this machine) you tend to end up with an awful lot of wasted pages.

Good value or not?

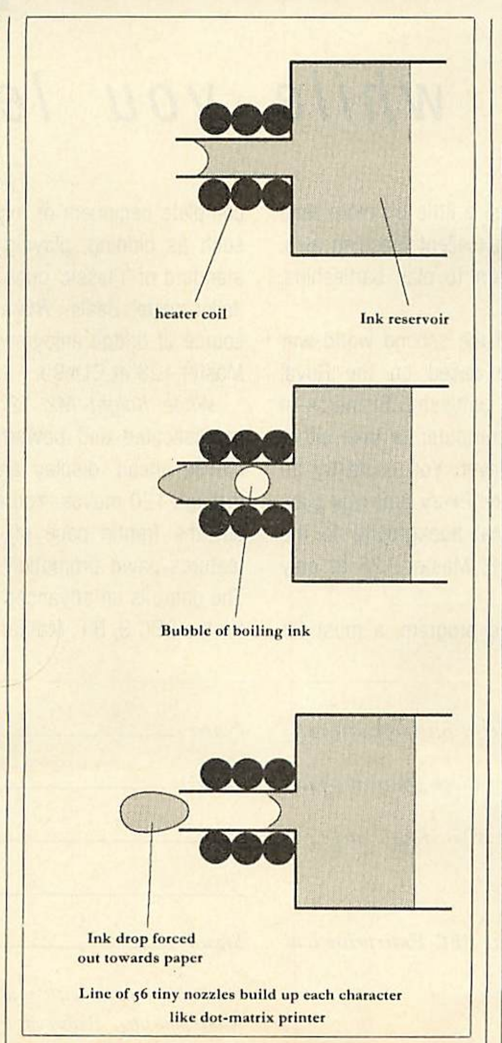
If you have either £900 or £1700 to spare on a printer, you would be hard pushed to find anything better value than these two. Both offer excellent quality, superb versatility with a wide range of (rather expensive) character fonts and sizes and tremendous graphics. The Deskjet is not as well built as the Crystal Print Series II and it is much slower. However, you get what you pay for.

It is difficult to justify paying twice or four times as much for a printer as you paid for your BBC micro in the first place. However, if you need perfect print-outs or want to get into real desktop publishing, there is little to beat either the Deskjet or the Crystal Print for quality – and nothing that can match their value for money.

The only real problem is that neither supports PostScript, the printer language used by some desktop publishing software. But they do both use the Laserjet control codes, which is the 'other' standard. Only the Crystal Print also accepts Laserjet add-on fonts. Choosing between them would be a difficult decision to make, were it not for the fact that the Deskjet is considerably cheaper. It seems that ink-jet and LCD shutter technologies can offer advantages over laser printers on price, and both of these beat impact printers hands down on quality.



The Crystal Print from Qume uses much of the laser printer's xerographic technology, but is not as expensive



Deskjet: spits ink at paper

WHAT ELSE IS AVAILABLE

Dot-matrix printers: generally the cheapest option and very flexible, though the printers are noisy, only moderately fast and give low-quality text. Letters are made up of columns of dots. Individual dots can be printed too, so graphic screen dumps are possible.

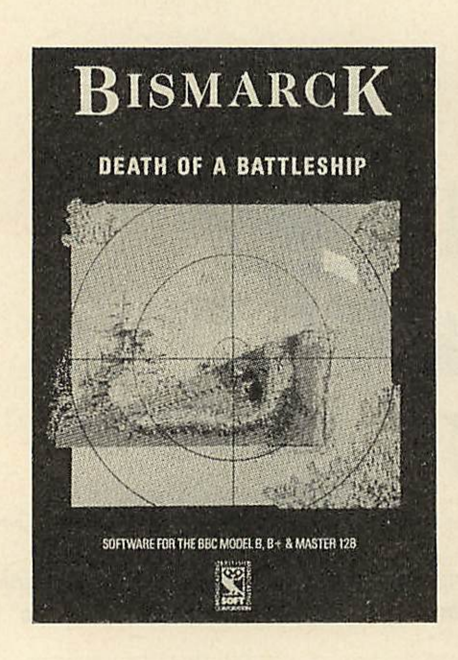
Daisywheel Printers: more expensive, very slow, noisy and less flexible, but the cheapest way to high quality. Print is indistinguishable from the best typewriters. The characters can only be changed by changing the daisywheel, but the range of high-quality fonts is large.

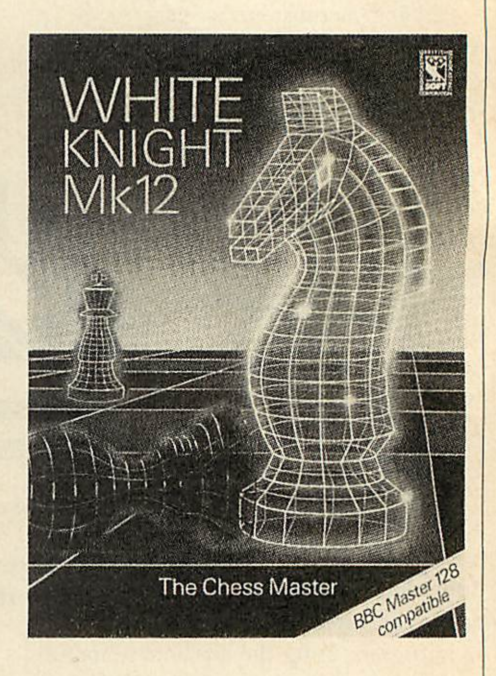
Laser printers: the most expensive technology, extremely fast, quiet and flexible. There are two main types. Postscript printers have a vast range of fonts available, and each font can be any size, but this type can't easily be used with the BBC micro. The HP LaserJet is the 'standard' office laser printer, and there's a range of new fonts available on cartridge and disc – but they are very expensive and so far can only be used in a small range of sizes.

OFFERS

B B C G A M E S







Play while you learn

The three BBC games on offer this month are all a little bit more than games, they are great fun to play while being excellent teaching aids. So pick up one or all of these games and learn to play battleships, bridge or chess this New Year.

Re-enact the most memorable naval battle of the second world war with *Bismarck,* the enthralling strategy game based on the Royal Navy's frantic search for the predatory German battleship Bismarck in the spring of 1941. Pit your wits against the computer or take either the British or German role against the other player. You could try an exciting alternative battle plan and remake history! Every time you play, the User Guide also gives you all the historical background to the battle. *Bismarck* is available for the BBC B, B+, Master 128 at only £14.95.

Black Queen is an absorbing Contract Bridge program, a must for complete beginners or experienced players alike. In addition to features such as bidding, playing and scoring, you can construct deals from standard or 'Classic' ones in books or newspapers, and experiment with 'tailor-made' deals. *Black Queen* offers you an almost inexhaustible source of bridge enjoyment and comes on disc for the BBC B, B+ and Master 128 at £14.95.

White Knight Mk 12 is a game with the features offered by a sophisticated and powerful chess program. These include a 'thinking moves ahead' display and a facility to step forwards or backwards through 120 moves. You can also change sides with the program or try out the frantic pace of playing 'blindfold' chess! *White Knight* also features pawn promotion and elapsed time clock for white and black. The game is an advanced update of *White Knight Mk 11* and is on disc for the BBC B, B+, Master 128 and Master Compact at £14.95.

Please send me ______ *copies of Bismarck at £14.95*

______ *copies of Black Queen at £14.95*

______ *copies of White Knight at £14.95*

*I enclose my cheque for £*______ *made payable to* BBC Enterprises Ltd

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SOFTWARE

SUPER STORAGE

SupaStore is a superb database manager that can even be used on a network, says Dave Futcher

There are plenty of database packages around for the BBC micro, on both ROM and disc: *Masterfile*, *ViewStore*, *System Delta* and *InterBase* are the most popular. *SupaStore* is yet another – but with a twist.

SupaStore Plus for the BBC B and Master is supplied on a 16k chip with a utility disc and an extensive sample database. The Master Compact and Archimedes (6502 emulator) versions are totally disc based. It was originally released in 1986, but has just been upgraded with a range of new utilities.

It's a random access database. All the data is kept on disc, so the amount of information stored is only limited by the size and type of your disc drive.

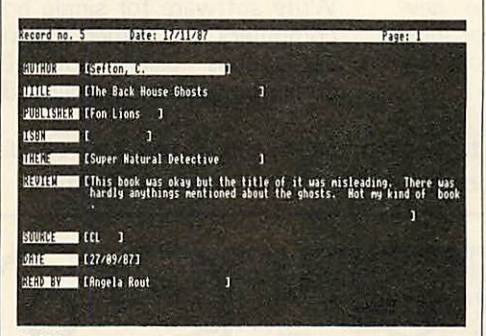
Don't think of *SupaStore* as just another database for the Beeb! Unlike any of the other BBC database packages it can be used 'stand-alone' or multi-user. When *SupaStore* operates as a stand-alone system, you have your databases stored on your own floppy or hard disc. In a multi-user situation, databases created by you and the other users are stored on the network file-server, each in a separate *SupaStore* sub-directory of each user's main directory. For instance, network user Dave will sign onto the network as *I AM DAVE then reach his database directory by entering *DIR SUPASTORE. Shared facilities like the *SupaStore* utilities are stored in a root directory called $.SUPASTORE. Whole databases that can be used by everyone on the network are also stored in a root directory, $.DATABASES.

Apart from the initial data entry and editing, you mostly choose actions from screen menus. You use the up and down arrow keys to move a cursor down a list of options. Some menus have a subsidiary option at the bottom – here you must first select the main option then proceed to the subsidiary option.

A new database is set up by using the 'Define a new database' from the menu



SupaStore Plus's new utility menu



Editing a record

Defining a new query

on the *SupaStore* utility disc, which is called up by typing *SSUTILS.

The first task is the database configuration, which covers the number of disc drives being used, their size (40 or 80-track), whether they are single or double-sided, the kind of printer in use (serial, parallel, or network) and the screen colours. The design of the record layout is excellent; you define each field in turn, and position them and their names within the blank screen area.

Field names are fixed at just ten characters. As field lengths are created, you can specify what kind of information is expected in each. As well as integer numbers, floating point numbers and dates in dd/mm/yy format, *SupaStore* allows telephone numbers as a special type of field. Each record can be up to seven pages long. It can include up to 500 words, 250 fields, and up to 250 characters in each field – surely enough for almost every application. Once you've saved the record design, it's still possible to change it later on.

Questions asked of the database are called Queries. After queries have been put to each record in turn, they and the list of records that answer their question are saved. The queries themselves are defined using yet another menu.

Information from the records matching queries is presented in reports. Originally the package could only provide reports in a standard fixed format. Now with *SupaStore Plus* you have an Advanced Report Generator that allows you to design page layouts, placing fields anywhere on the page and to combine your own text with the field information.

Reports are presented in the order that the records were stored in the database. This will be alright for many applications but *SupaStore* also offers the facility to sort the records into alphabetical or numerical order too.

SupaStore Plus has all the original *SupaStore* utilities, plus a collection of its own: the complete menu is shown on the top picture.

SupaStore Plus has great potential for all administrative and management tasks. I found it great for handling very large individual records. Unlike some databases it did seem at home with large files. On a hard disc, it was very fast. Its ability to handle a wide range of query options makes it superb.

SupaStore Plus *costs £55. Existing users of* SupaStore *can upgrade to* SupaStore Plus *for £17.50. The original* SupaStore *costs £39.95. It is available from ESM, Duke Street, Wisbech, Cambridge, PE13 2AE.*

REVIEWS

SOFTWARE

GO BY THE BOARD

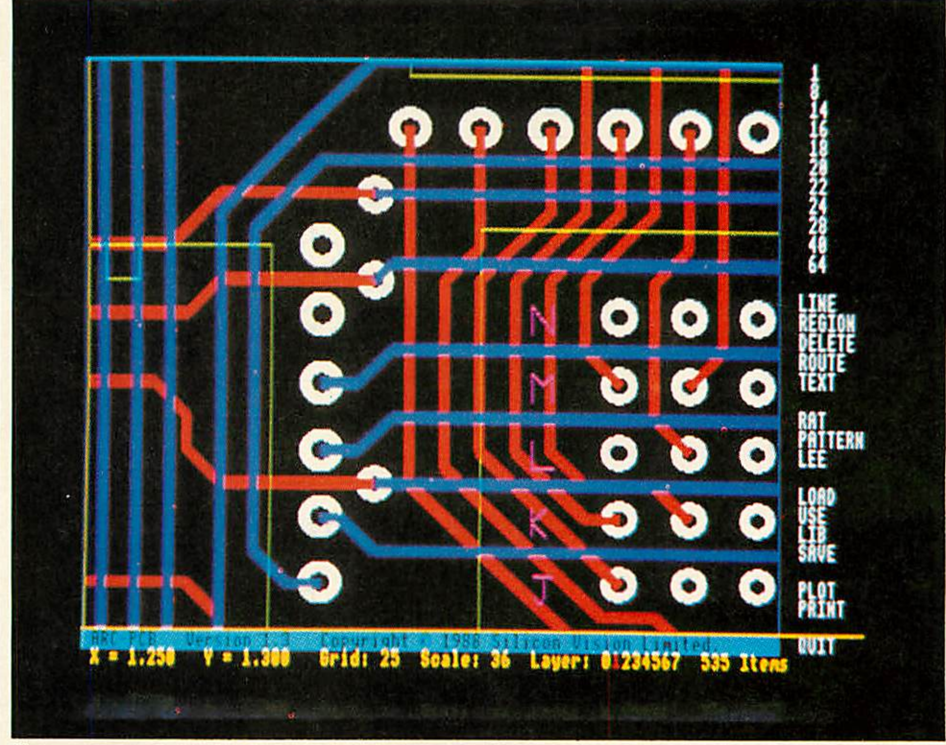
Rob Wilmott examines a new Archimedes package for drawing printed circuit boards, and finds it performs up to professional standards

It has been possible to design a professional-looking printed circuit board (PCB) on a home computer for some time. But all the existing packages suffer from some drawback or another – limitations on numbers of layers of circuitry that can be designed into the board, clumsiness of operations, or the difficulty or expense of transferring the design to a real PCB. With its new *Arc PCB* software, Silicon Vision has made a valiant and successful attempt to fulfil the needs of the huge number of home electronics hobbyists.

In itself, this is a reasonable achievement. But on close examination, it becomes clear that *Arc PCB* teamed with an Archimedes 440 is also the kind of system that will be at home in any research and development workshop, being used by more than just hobbyists.

The manual is well written and straightforward, and after a brisk read through, even the first time user will use it merely for reference and clarification of a few of the more obscure functions. The best and easiest way to become accustomed to the workings of this comprehensive software package seems to be to play with it for an evening. The entire package is supplied on one disc, and includes the PCB program itself plus a variety of printer and plotter drivers and utility files. This includes a hard disc installation utility. On your version of *Arc PCB* you may also find a number of Readme files. Silicon Vision has a policy of continuing improvement for *Arc PCB,* and the disc contains documentation on the latest changes.

The list of features of *Arc PCB* seems to read like a shopping list of all that's needed for a good PCB design package. Eight layers, rat's nesting, auto-routing, surface mount components, on screen help facilities, up to 300,000 items on the board, a 32-inch square work area, plotter and printer drivers and user-defined grid size – it's all there. The drawing can consist of eight independent layers, each like a transparent sheet that can be laid over the board design. One layer can be used for the tracks on the top of the board, a separate layer for the bottom of the board, a third and fourth for two layers of copper embedded within the board (four-layer boards are becoming more common – the Arc motherboard is an example).



You can zoom in to the active area of your network

So there's enough layers for even the most complex board, plus spare capacity for a component overlay and silk screen mask if these are needed. For a very simple board, there would be a component overlay, two copper layers and a silk screen. Where only two copper layers are being used, it is possible to disable the four unused layers, which allows for a faster screen redraw.

When drawing, you can switch the cursor between a full screen crosshair, useful for accurate component placement, and a tiny cross which moves faster and is useful for smaller details. The components and copper track lines snap to a grid, so placement can be exact. The mesh of the grid may be changed to suit any specific component pin out – it starts at 0.025-inch.

On the right-hand side of the screen there are a variety of device names to cover standard DIL chip packages, pads for discrete components like resistors and capacitors, and variable thickness lines. Any of these items may be selected with the mouse and positioned within the work area. As well as mouse control, there's a command line that you can use for all the options. Specific commands which are used regularly to select a specific type of line and thickness may also be programmed onto the function keys. On the circuit board, text may be freely mixed with the arrays of pads and track lines. Fine tracks can be led neatly between the legs of chip components, and there's even a facility for including

the latest surface-mounted components.

The arrow keys allow you to alter the viewpoint – scrolling the board design across the screen. The + and – keys provide a way of zooming in and out on the active area of your network. Sometimes it is quicker to change the scale of magnification with the equivalent command line function: when a complex circuit design is being viewed from close up, the redraw speed is slowed down.

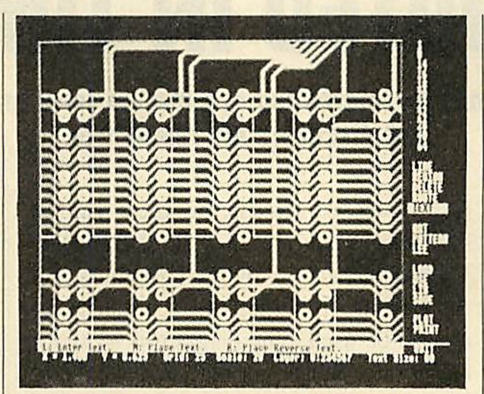
Regions of the design can be saved for future use. There is a comprehensive system for making a part of a design an item that may be stored in a library for recall at a later stage, or for incorporation in a future design. So you could build up libraries of sub-systems – a standard power supply or array of ROM chips for example.

Auto-routing

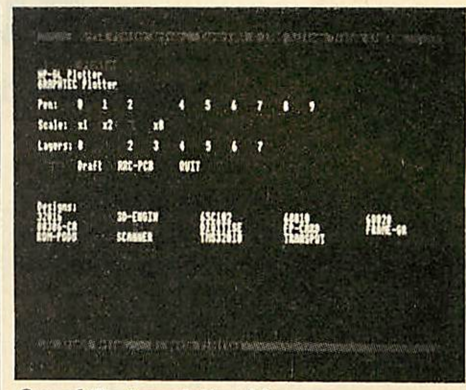
'Rat's nesting' is the process of linking up all the connections in your circuit design as straight lines leading directly from pin to pin. The exact route taken by each connection can be worked out later by the auto-routing system. *Arc PCB*'s rat's nesting ability allows you to use the mouse to draw connections between all the components, without having to consider any of the routing problems themselves. Once the shape of the board and all components have been laid out, you only need to link up every connection in the circuit. Once the rat's nest has been made, one of the two automatic routers may be invoked.

The Pattern router will seek out the most direct but not necessarily the ideal route between two points. Due to the small search area of the route-choosing method, some routes often remain unconnected – you put in these connections by hand. But the Lee router operates over a far greater search area and only fails if there is no physical route possible on that layer of copper. In this situation, you can make a connection to another layer and select the auto-router to finish the job. The quality of the routes chosen by the two routers seems fair, although not quite up to the standard of either an experienced board designer working by hand, or the best auto-routing.

Using the region command, it is possible to select a block of circuitry and move it across the circuit board, including all the connections. In this case the line connections remain made; new rat's nest lines appear, which may again be auto-routed. It is also possible to exclude specific areas from the auto-routing at the rat's nest stage.



It's possible to place text on the board



One of the two plotter drivers

Printing

Running the *Arc PCB* system with a monochrome monitor is something that should be avoided if at all possible. And the addition of a plotter provides a much higher quality of final output. Of course, this doesn't mean that it's impossible to manufacture a board using a dot-matrix printer – even 9-pin dot-matrix print-out at twice full-size is very good, especially after the clean-up routine.

The design consists of a list of components and connections. This means the final output quality depends only upon the printer or plotter used. The printer drivers include FX (8-pin) and LQ (24-pin) dot-matrix drivers, plus two options for plotters. Many plotters use a set of codes known as Hewlett Packard Graphics Language, and there's an HPGL driver, plus one for Graphtec plotters. There are also specialised commands to control individual pens directly.

Another option is to send your completed board design off for professional manufacture. It isn't cheap, but there are a couple of companies, LP Circuits and Cannon Electronics, which offer to make up boards from designs on Arc discs: you send them a disc, they send you any number of complete, finished printed circuit boards. Both companies can plot your design on high-quality plotters, so the final board should be as neat as the most professional PCB.

At £195, *Arc PCB* is expensive for ARC software. But it stands up well to comparison with the very best circuit board design software on the IBM PC – like a full OrCAD system that costs nearly £10,000. *Arc PCB* isn't quite as good as that, but it is comparable. It makes the Archimedes a credible, professional tool for board design, and it's from industry that most of the early *Arc PCB* buyers have come – the Arc and software together cost less than similar software on the IBM PC.

To emphasise the professional nature of its service, Silicon Vision also offers a year's telephone hotline support for £100, and for another £75, you'll automatically get any and all upgrades of the package for a year. This could be good value for a system that's been significantly improved four times while this review alone was under way.

Silicon Vision is currently working on extending the system to include even better auto-routing and schematic capture – that is laying out the components and rat's nest connections from a circuit schematic. This is planned for the spring, and won't be included in the £75 upgrades. But it will make the system one of the cheapest yet most comprehensive available on any micro.

Silicon Vision, Signal House, Lyon Road, Harrow, Middlesex HA1 2AG, Tel: 01-422 2274. Cannon Electronics & Automation, Whitegate, Hatfield Heath, Bishop's Stortford CM22 7ED, Tel: (0279) 730709 (Jane Cannon). LP Circuits, Unit C3, Swingbridge Road, Loughborough LE11 0JB, Tel: (0509) 610580 (Andrew Saunders).

SOFTWARE

ROOTED IN TIME

Michael Leete finds an interesting application for a graphics package and discovers his family tree

Pineapple's *Diagram II* has evolved from a program created for the design of electrical circuits, and is now available for the whole BBC range of computers.

Many improvements have been made to the original concept, making the program more versatile. Pineapple claims it is suitable for genealogy – drawing trees – and has some features that dedicated genealogical packages don't.

Limited free-hand drawing is possible, but the program is mainly intended for rectilinear designs. Using the free-hand facilities for even a simple curvy design such as a wrought-iron gate is rather laborious. And it may prove to be too much for the program's capacity: straight-line designs are stored much more efficiently on disc.

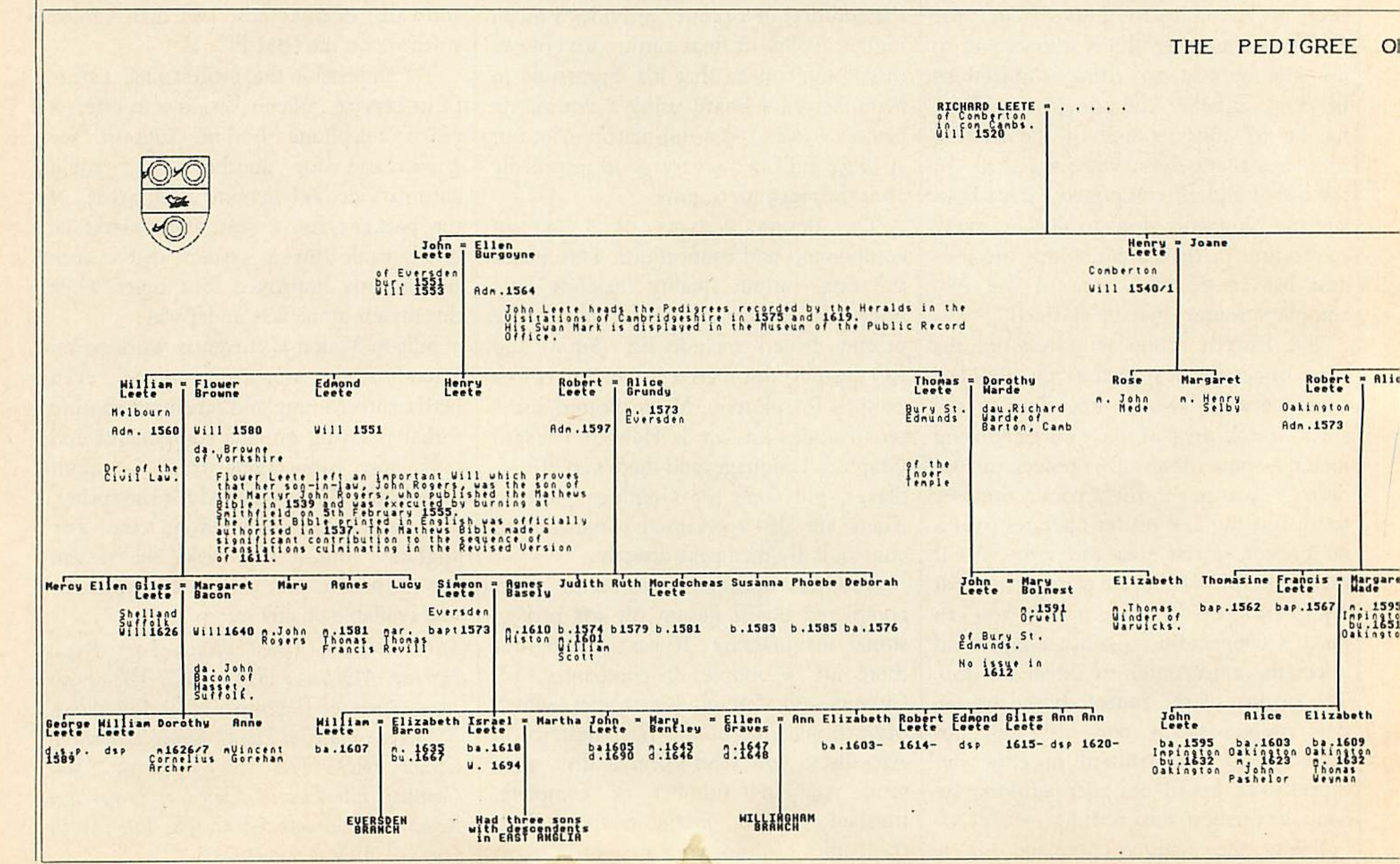
The size of a design is measured in mode 0 screens, and an 80-track DFS disc stores 30 screens. So there can be, say, 6 by 5 screens in a single diagram. Each screen is 80 by 32 characters, but the bottom five lines of the total design cannot be used. The diagram is stored as characters, which means that, in theory some 72,000 characters may be stored on one disc surface. However the complexity of the design is limited.

In essence, each screen is divided into character-sized 8 by 8 pixel blocks, and every block, whether a blank or any other shape or letter is a user-defined character. There can be only 1024 of them.

This is like 15th-century printing – if Caxton needed to print a new character, he first had to carve the die or mould. Once he had made the die, he could print any number of that particular character, using the same die over and over again to cast his lead type. The program stores a maximum of 1024 dies, of which 144 are pre-defined to give a full keyboard set, plus a selection of lines, corners and junctions. Free-hand drawing obviously uses many permutations of pixels in each block, needing more and more dies or user-defined characters. Straight line drawings, with no text, use only 16.

Using *Diagram II*, the size of single drawings may be greater than the screen, and there is a facility to rotate printing through 90 degrees. Since any design may be printed at a range of horizonal and vertical scale, the only limitation on the size of a hard copy becomes the width of the printer's carriage.

Printing can be upright or sideways, 'portrait' or 'landscape'. This ability to rotate the print-out is vital for genealogists. Family trees are invariably very much wider than they are deep. After all,



10 generations stretch back to around the time of the Great Fire of London in 1666, but 10 names across would represent a very modest 19th-century family. What you need in genealogy is 'seascape', not just landscape printing.

Family trees usually trace ancestry in a single patronymic, and genealogists call them pedigrees. A pedigree itemises all the parents and grandparents, and again, the width increases rapidly. This program could be useful to any breeder who has to supply lineage of dogs, bulls, horses, pigeons or whatever. Even plants have a complicated breeding history that is easier to follow in the 'tree' format.

The drawing and editing routines in *Diagram 11* might have been designed with the genealogist in mind. Lines that trace lineage and link each household together are drawn easily by guiding the cursor with the arrow keys, a trackerball or a mouse. Text may be entered either directly from the keyboard or run into boxes from an Ascii file produced by a wordprocessor.

Often families are entered as research progresses; there are routines for nudging their position around the screen or moving any area bodily across the whole diagram. These routines are fundamental to the genealogist's needs. In my own family there were 13 generations recorded in the parish register at Thrapston, Northamptonshire, but many lateral branches of the family were found in the surrounding parishes. A lineage of sorts was established at Thrapston, but as the neighbouring parishes were researched, the pedigree diagram had to be stretched in places to accommodate all the marriages and the resulting issue.

The screens that make up the diagram are numbered by the program, and these numbers may be displayed if required. Starting from the main menu, you are first invited to enter the number of the screen you want. This is fine if you have a clear mental picture of the whole tree. But if you don't, the screen may be scrolled around the diagram.

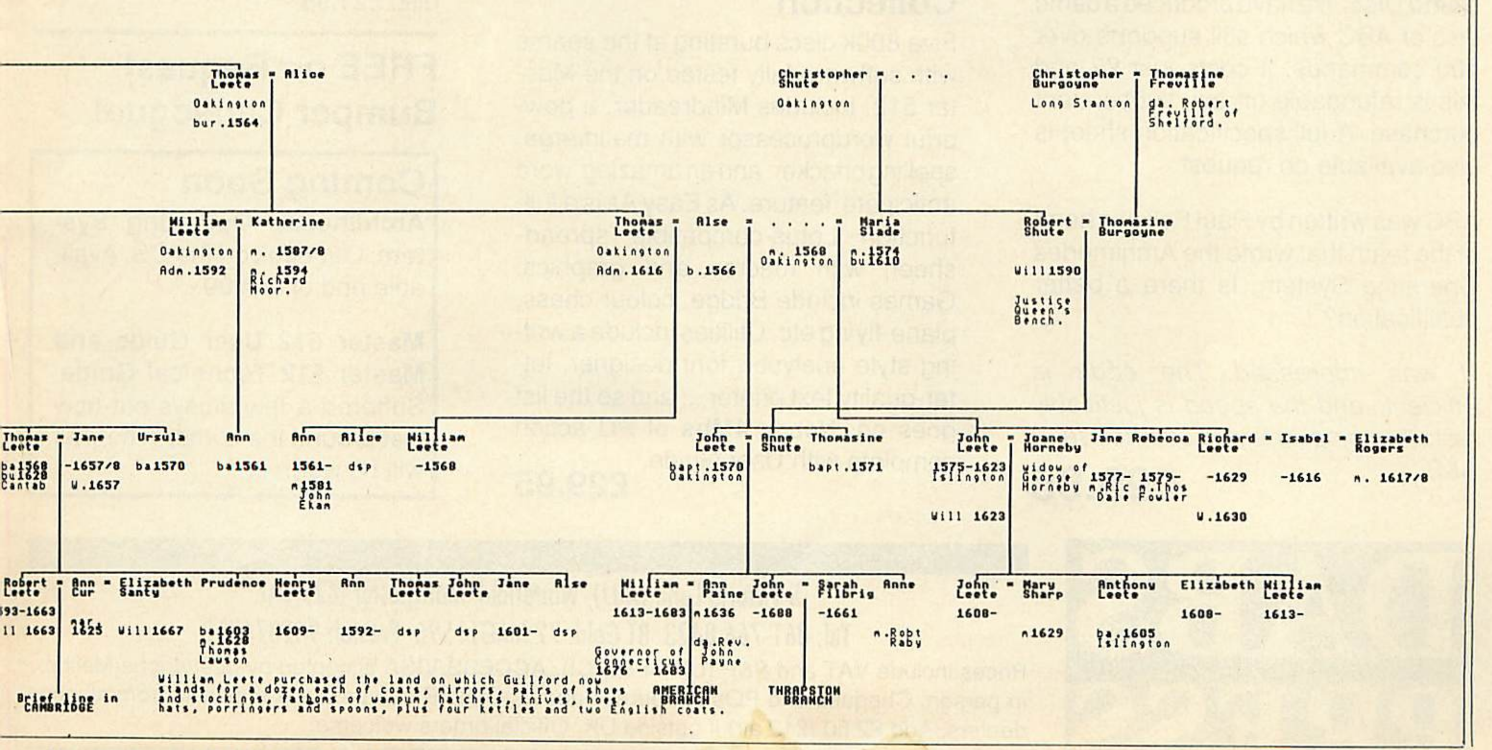
The speed and smoothness of the scrolling has been criticised but the speed is mainly determined by the speed of disc access. There is also an indexing facility, which is particularly convenient for pedigrees: a screen can be indexed by name, so if the head of a dynasty is chosen for the index, his family may be accessed quickly from his name.

Another good feature is the 'thumbnail' display – a small version of the full diagram. It's helpful in correcting the 'balance' of the full-sized version.

Several pages of the manual are devoted to printing. Dauntingly, the instructions include the phrase 'get your printer manual'. But it seems to be easier done than said: the example was printed on an old Canon PW1156, after only one false start.

The result is not so handsome as the finest handwritten pedigrees but, in my view, it is a creditable effort. Above all, it is a framework for further research that may be modified without having to re-enter any of the information. In short, *Diagram 11* is a kind of genealogical wordprocessor.

Diagram 11: *£63.25 from Pineapple Software. 39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL.*



A chunk of any family tree would have shown *Diagram 11* in action. I chose this particular section because I am still researching a possible connection between the senior and cadet lines in the surnames Burgoyne and Rogers, and because it contains a small, historical reference. Historians of the 16th century will know that Queen Elizabeth hoped to avoid war with Spain right up to the eleventh hour. She didn't grasp that Philip of Spain saw himself as the instrument of God in stamping out Protestantism, so she believed peace proposals from the Duke of Parma were genuine. Her peace commissioners to the Netherlands included Doctor John Rogers, son of John Rogers and Mary Leete and grandson of the Maryan protomartyr. Failure of the peace moves led to attempted invasion by the Spanish Armada in the year of 1588.

OFFERS

STOP PRESS AND SUPER ART



For a short time only, BBC Acorn User *magazine has organised a sale of* AMS Stop Press *and* Super Art *for our readers.*

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Torch CPN, BBC DFS and ADFS.

The programs are menu-driven, and allow you to COPY, TYPE, HEX dump, ERASE, PRINT, RENAME files, to get a DIRECTORY and (in some cases) to FORMAT discs. Access is also allowed to BBC * commands. 'Wildcards' are supported.

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DTP

IT'S A PASTE UP

Tony Quinn reveals how your trusty wordprocessor and dot-matrix printer can help you produce professional pages



Broadway adway roadway

Surveys tell us publishing is a very popular activity among our readers.
Desktop publishing is one of those great buzz phrases, yet many people don't need it, and others fail to realise that even better results are often possible by doing most of the task with an everyday wordprocessor and good printer.
Surveys tell us that publishing is a very popular activity among readers. Desktop publishing is one of the great buzz words, yet many people don't need it and fail.
Fail to realise that even better results are often possible by doing most of the task with an everyday wordprocessor and good printer.
Surveys tell us that publishing is a very popular activity with our readers.
We know desktop publishing is one of the great buzz words, yet many people don't need

by Reporter

this, and others fail to realise that even better results are often possible by doing most of the task on a printer and wordprocessor.
Surveys tell us that publishing is a very popular activity among

this, and others fail to realise that even better results are often possible by doing most of the task with an everyday wordprocessor and good printer.
Surveys tell us that publishing is a very popular activity among readers. Desktop publishing.

Broadway roadway

Of the great buzz words, yet many people don't need it at all.
Others fail to realise that even better results are possible by doing most of the task with their wordprocessor.
Surveys tell us that publishing is a very popular activity among readers. Desktop publishing is one of the great.

Sidehead

Yet many people do not need it, and others fail to realise that better results are possible by doing most of the task with an everyday.

Broad roadway roadway

Surveys show that publishing is a popular activity among readers.
DTP, or desktop publishing is one great buzz.

Sidehead

Yet people can fail to realise that even better results are often possible by doing

indeed do it all with an everyday wordprocessor and good printer.
Surveys tell us that publishing is a very popular activity among readers. Desktop publishing is one of the great buzz words, yet many people don't need it, and others fail to realise

that even better results are often possible by doing most of the task with an everyday wordprocessor.

Sidehead

Surveys tell us that publishing is a very popular activity among readers. Desktop publishing.

A wordprocessor, good printer, DTP package to produce the headlines and a photocopied picture have all helped produce this page

Our reader surveys tell us that publishing is one of the most popular tasks on readers' micros. Desktop publishing has become one of the great buzz-words, and yet many people don't need it, and others fail to realise that better results are usually possible by doing most of the job with a wordprocessor and good printer.

What fools people is the wonder of getting the page, complete with text, headlines and pictures, on one sheet of paper. This seems very impressive, but when you compare the quality of the text typeface used by the BBC micro's DTP packages, it's rarely better than you get with a 9-pin dot-matrix printer. And of course it's a lot worse than you get with a daisywheel, 24-pin or laser printer.

Remember that you're undoubtedly going to photocopy the page anyway, so the fact that it might be made of strips of text (known as galleys) and separate pictures stuck on a board, rather than printed in one go, is irrelevant.

Headlines and graphics are where the wordprocessors fall down – so the solution is to use both DTP and wordprocessing software. The sequence goes like this. First plan your page layout on a pre-designed standard grid. Decide how many characters wide each column should be, and how many lines there should be in each story.

Next edit the stories into the right shape and number of lines and print out your 'typeset' galleys using a normal wordprocessor. Then you can prepare the headlines and graphics in the DTP software and print them.

Now you've got to stick it all down onto a grid. This can be messy, and you'll need a scalpel, a metal ruler and a glue such as Cow Gum. (The beauty of Cow Gum is that you make a ball of the excess as it dries, which can be used to rub off any smears cleanly.)

Cut the galleys up very close to the actual text on all sides, and it's best to do a dummy run first to check it all fits. Remember to leave at least a line space above and below headlines – space or 'white space' as it's known in the newspaper world is very important on the page.

Work from the top of the page on a good flat surface, preferably with a cutting board beneath it, so you don't scratch the desk with your scalpel. One way to do a grid sheet is to print out a master with guidelines at the top and bottom for the edges of the columns, and marks down each side for the lines of text. These can be chopped off, or alternatively covered with liquid paper, when you've finished the page.

Stick down the sheet of paper you're pasting onto with masking tape. If you've got a draughting board, so much the better. The bottoms of all the letters should line up across the page, and this should be checked with a ruler. You will probably find that getting the strips of text to line up is one of the trickiest jobs that you will have to tackle.

Rules can be put in by hand last of all (or printed with the text if you're crafty on the wordprocessor and the printer has a vertical line).

When the paste-up is finished, do a test photocopy to see how well it reproduces. You may well find that the blacks on the headlines don't come out very well. If this is the case, simply touch them up with a pen. If you discover that ungainly faint lines show down the edges of the strips of galley, simply run some liquid paper down the edge. If there are any blobs or marks on your completed page just clean the photocopier's glass or get the liquid paper out again.

If you ran some kind of magazine before you had a micro you may well be sitting there saying: 'I didn't get a computer just to go back to scissors and paste.' But you should be looking to get the best results from the technology you've got.

A BBC micro screen dump used by a DTP package has a typical resolution of 72 dots per inch across the page. But a dot-matrix printing near letter quality text has about 150 per inch, a 24-pin printer about 200. Laser printers give 300. So why waste all that printer technology?

INTERLUDE

MAKING MELODIES

Two simple routines for you to try and all the latest micro music news from our expert, Ian Waugh

In this month's yellow pages you'll find two short routines for the Hybrid Music System which let you save Ample screens to disc. This isn't quite as straightforward as it may appear. Typing:

*SAVE screen 7000 8000

works, but the saved screen will contain the *SAVE command! Listing 1, *4dump*, demonstrates an alternative method and was designed to save Stave Editor screens. Incorporate the word in your program, and when you're ready to dump the screen simply enter '4dump'. The second-last line removes the '4dump' command and replaces the Ample per cent prompt before saving the screen.

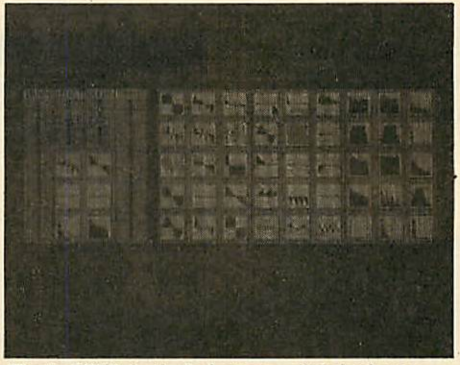
Listing 2, *7dump*, is a bit more clever. The construction REP(...)UNTIL(...) REP is housed inside player number 9, and it simply sits there doing nothing until the CTRL key is pressed. Then it saves the screen. This allows you to save, for example, the Mixing Desk screen after a piece has started to play. Note, that the Ready command stops execution of all players so '7dump' must be issued after the piece has started to play.

The final point to note is how OSCLI commands are used from within Ample. The command string is put onto the stack immediately before the OSCLI command is issued.

Dudley's data

David King of Dudley College of Technology has written to pass on details about the DCT Database Project. It's a free, on-line source of information, mainly for teachers, which simulates business databases and provides worksheets and teacher's notes. Of prime interest to Music 500 and 5000 owners is the Ample area which contains many tunes, articles, hints and tips.

DCT has permission to use many of the MusicLink files that appeared on Prestel before the advent of Music City. It also has an arrangement with the MCPS to use copyright material, but that is available only to members of a closed user group called Maestro. You can join



Music 5000 Junior's instrumental designer

for the princely sum of £2 for six months or £3.50 per year. All you need to log-on is a modem and Prestel-compatible software. There are two lines: (0384) 239944 for viewdata callers and (0384) 238073 for scrolling terminal or viewdata callers. The system uses Communitel and EBBS host software.

Key facts

Christopher Game of Colchester has written to say he would like to see reviews of all the MIDI-compatible keyboards on the market. This isn't really the province of *BBC Acorn User*, but there are two publications currently available which should interest any prospective keyboard-buyer. The first is a book, *Keyfax 3* by Julian Colbeck, which contains over 200 mini reviews of synthesisers, electronic pianos, samplers and home keyboards. It's available from Music Maker Books for £10.95 plus £2 package and postage.

The second is a magazine called *Every Single Keyboard*, which contains reviews of every current single-manual keyboard of the auto rhythm/accompaniment, all-singing, all-dancing variety. Get it from your newsagents, or direct from the publishers, Bookrose. It costs £2.50.

Music notes

■ Pandora Technology has begun developing music software for the Archimedes. It has identified three market areas – the professional user, the amateur and education. The accent in all cases will be on colour and real-time displays which exploit the power of the Arc.

Pandora hopes to have something to show the world at the Frankfurt Music Messe in March and is looking at July for a release date.

■ In a new venture, Amplinex is sponsoring a series of broadcasts of Ample music programs by the BBC's Ceefax telesoftware service. The first selection to be broadcast (December or January) is a collection of the most popular pieces of original music published by Amplinex durings it first year. The broadcast agreement is between the BBC and the Amplinex members concerned.

■ Hybrid has recently released three new Ample albums for the Music 5000 – *Music City 2*, *Ample Vibrations* by David Reed and *Return to the Homeland* by Obernell. More info in the next Interlude.

Hybrid is also about to release an album from DCT written mainly by the editor, Alistair Johnston, aged 18. I've heard some of the tracks and their excellent sounds are well mixed, arranged and orchestrated.

■ Fans of wacky Ample musician Pilgrim Beart will be pleased to know that another of his Ample albums is on the way. Rumour has it, however, that some parts of it were just too wacky and he has been asked to tone it down slightly before it's released.

■ If you have any musical tips you'd like to share, or if there are any topics you'd like to see covered in this column, please write to Interlude, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place London N1 6DJ.

Dudley College of Technology, The Broadway, Dudley, West Midlands, DY1 4AS. Music Maker Books, Alexander House, Forehill, Ely, Cambridge CB7 4AF. Tel: (0353) 665577. Bookrose Ltd, Tileyard House, 18 Tileyard Road, York Way, London N7 9AN. Tel: 01-609 5781/2. Amplinex, 26 Arbor Lane, Winnersh, Berks RG11 5JD. Hybrid Technology Limited, Unit 3, Robert Davies Court, Nuffield Road, Cambridge CB4 1TP. Tel: (0223) 316910.

LETTERS

BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. BTG/TTNS 81:RED001

COMPATIBILITY QUERY

Sir, I have a standard BBC B with the disc filing system and a *Wordwise Plus* wordprocessing ROM. I would like to know if it's possible to upgrade to a Master and yet keep compatibility with my BBC B software. If so, could you please tell me what hardware I would need and give me approximate prices.

J Robbins
Acton Trussel, Stafford

The Master 128 comes with the disc filing system (and ADFS) as standard, so it is just a case of connecting your existing disc drive. As regards the *Wordwise Plus* chip, it should work straight away on the Master. There were some problems with early versions of the ROM: if you have problems, contact Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX; Tel: (0442) 63933.

BBC TO PC AND MAC

Sir, I recently decided to upgrade from my Electron to a larger machine. But the high price charged in Norway for the Archimedes – typically £1200 to £1300 for the basic 305 – means that I will have to go for a cheap PC clone instead.

As I have a lot of experience with BBC Basic, I was particularly interested in a company called M-Tec, which produces BBC Basic for the IBM PC. Could you tell me where I can get more information about this product?

Thor Ludvigsen
Vingersjoveien, Norway

Sir, I read with interest the software news in the April 1988 *Acorn User*. In it, there is mention of BBC Basic on the Apple Macintosh, Beeb-to-Mac transfer software and *Kermit* software for transfer of data. Could I use this system to transfer *Wordwise* files?



Transfer words Beeb to Mac

Sanjib Baruah
Interprint
New Delhi, India

M-Tec's BBC Basic(86) supports all features of the original Basic on the BBC micro. *View-to-Mac* from Human Computer Interface has now been updated to allow transfer of both *Wordwise* and *InterWord* files to *MacWrite,* as well as *View* files. HCI also produces BBC Basic for the Macintosh. For more details – and addresses of the suppliers – see David Atherton's article on page 79.

COLOUR CHARTS

Sir, I have recently purchased a Star LC10C colour printer, for use with my standard 32k Beeb. My problem is that there isn't a single dealer in this area who is prepared to help me find suitable software for the new printer.

I am interested mainly in colour graphs and pie charts, plus large character printing for posters. I have *Wordwise Plus* on ROM and *Mini Office 2* on disc. The latter produces graphs and pie charts which I assume will print out well on the Star.

Could you suggest a reasonably priced package to utilise some of the functions of this colour printer? I have a single-sided 40/80 single disc drive and DFS 1.20.

Martin Fannon
Bedford

The Star LC10 is compatible with the Epson JX80 colour printer and should therefore work with any software that uses that printer's features. *Colour ScreenPrint* from ESM (previewed last month), and *Acorn User*'s own UserDump ROM both allow up to eight colour screen dumps to be produced. ESM are at Duke Street, Wisbech, Cambridgeshire PE13 2AE.

If you want to print large 'poster' characters, try *Sign Writer* from Wight Scientific (44 Roan Street, London SE10 9JT.) *Acorn User* reviewed it in December 1988.

ALTERNATIVE PUBLISHING

Sir, *Symbiosis* is a new, bi-monthly, non-profit making national magazine devoted to positive, humanist and spiritual alternatives. The whole publication, apart from headings and diagrams, is produced with *InterWord,* on BBC B


Graffiti Is It Good Or Bad?
Andrew Lake and Kieran Summersgill
Tackling Vandalism
Environmental Considerations
APOLLO RECORDS
11

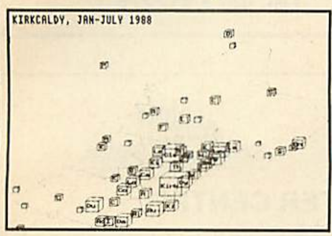
with Shadow RAM. Using condensed justified text over two columns gives us some 1500 words on average on an A4 page.

Eric Twose
Editor, *Symbiosis*
Scarborough, N. Yorks

***Symbiosis* is available from 43 James Street, Scarborough, N Yorks YO12 7PH. The illustration shows what can be done with a Beeb and wordprocessor. But setting it with three narrow columns rather than two might give it a better look. You could also try unjustified columns. For further advice, see Tony Quinn's DTP article on page 145.**

QUALITY MAPPING

Sir, The article and program by Michael Geller in the December issue of *Acorn User* were just what I wanted: a means of dumping maps to a much higher quality than a normal screen dump can man-



Double resolution dumps

age, without using a plotter. But I found that maps which are plotted to scale from the screen centre, with the graphics origin altered using VDU 29, required a minor alteration to the co-ordinates. Also, it would not handle text, such as place names, which can be positioned by coupling the text and graphics cursors with VDU 5.

The following changes have been proved in practice on my Model B, as the sample map shows. Add six lines and modify two others as follows:

```
  24 REM Modified to handle cen
tred graphics origin
 120 xorig%=640
 130 yorig%=1024-YGrOff%
  25 REM Modified to handle joi
ned cursors
  85 joincurs%=0
 204 IF byte%=4 THEN VDU 4:join
curs%=0
 205 IF byte%=5 THEN VDU 5:join
curs%=1
 206 IF joincurs% AND byte%>31
AND byte%<127 THEN PRINT CHR$(by
te%):GOTO 220
```

Lettering produced by the additional lines 204-206 is single-height, not double, and is especially suitable for use in labelling topographic details or symbols. For this to work, though, each letter must be separately positioned by VDU 5 and a MOVE command in the program that produces the screen image. A suitable procedure can be devised to handle this using LEN(print$).

Robin Smith
Kirkcaldy, Fife

EMULATOR ENHANCEMENT

Sir, I have recently graduated from my old Model B to an Archimedes with PC emulator. Even more recently, I've moved to America. I'd therefore like to offer the following tips.

I have been running all my equipment (Arc, Beeb and Microvitec monitor) from the US mains normally used for 'heavy current' devices such as tumble driers and cookers. This is 240v and 60Hz, rather than the 110v, 60Hz of normal North American mains. I've been running like this for several months now with no problem at all.

I use the PC emulator a lot (due to the large number of PCs here) and have found that a lot of software requires two disc drives. It is also difficult to copy files from one disc to another with just one drive. This can be overcome by creating a 'config.sys' file which in turn creates a RAM drive.

To do this, insert a working copy of your DOS boot disc in the drive, making sure it isn't write protected. At the A> prompt, type:

```
copy con config.sys
device=ramdrive.sys 64
<F6>
```

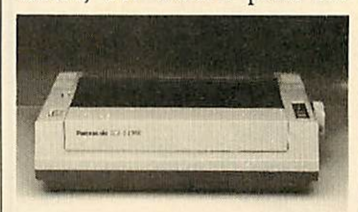
Function key 6 ends the copy con file and saves a file called CONFIG.SYS on your DOS disc. If you already have a config.sys file, add the above line to it.

The number after 'ramdrive.sys' is the size of the drive in kilobytes, and may be any value from 1 to the size of available memory. It is usually possible to set aside 100k or so. Two further parameters are possible: these are the sector size (which can be 128, 256 or 512 – the default is 128), and the number of files (between 2 and 512 – 64 is the default).

Philip Griggs
Cincinnati, Ohio

MASTERING MARGINS

Sir, I have a Panasonic KX-P1081 printer, and I'm very happy with it. But there is one problem which crops up from time to time. I use a lot of single-sheet paper to write letters, but when I print the



Panasonic's popular printer

text, the printer turns the paper up by about two inches before printing.

I am using a Master 128 and *View* wordprocessor. I have tried changing the DIP switch in my printer, but this seems to have no effect.

M Perry
Brentwood, Essex

The reason for the paper being moved up is the way that *View* sets out its pages. In *View* there are five separate margins that can be altered on a page; the top, header, footer and bottom margins, plus the left margin. When you use *View* for the first time, the default values for these margins are all 4 lines, except for the left margin which is set to zero characters. If you want to print text right at the top of a page, you must change the top and header margins to zero – TM0 and HM0.

It is also worth pointing out that the page length (PL) value includes the margins That is, if you were to have a page length of 66, and default values of the margins, there would be 66 minus 16 for the four margins, minus two lines for the header and footer themselves, or just 48 lines of text.

SHED THOSE PROBLEM POUNDS

Sir, A few small modifications can improve Mr Briant's excellent program in Archimedes Agora, December 1988.

Epson printers set for the 'standard' UK character set print the hash as '£', which can be a problem if the listing contains both characters. This can be overcome by setting the printer to produce a different character set when '#' is detected, and switching back to the UK set when a '£' is encountered.

```
570 .writeintercept
571 STMFD R13!,{R0,R14}
572 CMP R0,#35
573 BNE nothash
575 ADR R0;hashcode
576 SWI "OS_Write0"
578 .nothash
580 CMP R0,#163
581 BNE notpound
582 ADR R0,poundcode
583 SWI "OS_Write0"
584 LDMFD R13!,{R0,R14}
585 MOV R0,#35:B next
586 .notpound
587 LDMFD R13!,{R0,R14}
588 .next
589 TST R0,#&80
590 MOVNE R0,#ASC(".")

1701 .hashcode
1702 EQUS (CHR$1+CHR$27+CHR$1)
1703 EQUS (CHR$82+CHR$1+CHR$0)
1704 EQUB 0
1705 ALIGN
1706 .poundcode
1707 EQUS (CHR$1+CHR$27+CHR$1)
1708 EQUS (CHR$82+CHR$1+CHR$0)
1709 EQUB 0
1710 ALIGN
1711 .end
1720 ]
```

Charges for PrintFix module

The changes in the box should be made to the original listing. The printer parameters are set in lines 1702. The Arc uses Ascii code 163 as its pound sign, and the original program converts this to a dot. My changes simply remove the top bit from that character, so that it will be printed as '£', at the same time making sure that the printer is configured for the UK font. The only disadvantage is that the hash and the pound symbols both appear on screen as '#', but both are properly represented on the hard copy.

Peter Howard
Church Crookham, Hants

ACORN USER ADVERTISEMENT PAGES – FEBRUARY 1989

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Radio. Radio Amateur Micro User Group: contact by Bulletin Board No. 8630198

FREE ADS

If you are an Archimedes amateur programmer and would like to correspond with another one, then write to: Jason Mathiopoulos, 59 Tatoioy Street. 14561, Athens, Greece.

Master turbo, *Overview*, AMX mouse, colour monitor. Ideal professional use, £695. Complete sets, *AU*/Beebug mags. Offers? Tel: (0926) 335952.

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AMX mouse and *SuperArt* with manual, for BBC Master 128. Offers over £25 cash. Tel: (0673) 60892 (Lincoln).

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Acorn disc drive, 40T/SS in case, but no leads. Full height 5.25-inch, hence £30. Tel: (084428) 487. Sell or swap.

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Master 128, little used, Microvitec Cub1451A, 40/80 drive, Panasonic printer. Teletext adaptor, ROM board. mouse, *Questprint*, £950 ono. Tel: (09182) 327592.

Master 128 + 512, package, Watford DP35-800S, dual disc drives. Watford plinth, *InterWord InterSheet*, & two ROM adaptors + manuals, £525. Tel: (0442) 866895 (evenings).

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Electron, Plus 1, Plus 3, E2P, ROM box, T2P3, *View*, *ViewSheet*. Acorn database, MCP 40. Printer, £390 ono. Tel: (0536) 722818 (eves).

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Wanted: Status as corresponding member of UK computer club. Retired engineer. Special interests: computer graphics. 1B Heide, 2Y Bueager, DK2950, Vedbak, Denmark.

Wanted Arpeggio Studio 24 Plus, for Archimedes, with or without midi interface. Tel: (0872) 865449.

Wanted Acorn Electron, plus 1 cartridges, eg *Hopper Snapper*, etc. Please contact Brett, 01-550 4239 (eves).

Wanted AMX mouse, with software and APS for Acorn Electron. ROMs also wanted. A Davies, 18 Greenway Ave, Stowe, Staffs ST15 0FR.

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ACORN ABUSER'S

DIARY

New Year revolutions

No sooner are the flames on the plum pudding damped down than it's time to make New Year resolutions. *BBC Acorn User* has had an unofficial preview at the resolutions of some well-known stars of stage and screen.

Dave Atherton: watch the phone bill and get a new suit.

Brace Smooth: buy property in the Pacific, because many islands have vast deposits of guano and the rates are low.

Peter Davidson: remember that imitation is the sincerest form of flattery.

William Stoy: be yet more wonderful still. And don't use a ghostly green screen when demonstrating RISC OS.



The three just men (only just): Smooth, Spencer and Atherton

Harvey Coleman: be nice to people expecting babies.

Clive Grace: stiffen resolve not to take non-Acorn advertising. Buy an IBM PC.

Mark Webbing: get hair cut to look less live Clive Grace without his glasses.

Graham Bartram: never again tempt fate (and misprints) by calling a font Porkerhouse.

David Spencer: can't remember what the resolution was, but it was something about floating point arithmetic.

Mike Williams: never fall off a foreign bar stool again.

Rob Miller: get the month right on the monthly disc.

Joe Telford: to get programs to run without shadow RAM.

Dave Futcher's resolution was too long to be printed here.

William Benjamin: never fall ill just before a book deadline.

Tony Quinn: never get involved with deadlines again.

Roger Wilson: clean the whiteboards before being interviewed by *BBC Acorn User*.



Slimline Bartram

David Lawrence: get a haircut.

Mad Alex: never write another book (again – see Abuser February 1986)

Graham Bell: buy a louder alarm clock.

Sadly, Acorn spokesman Mike 'Michael' Page declined to reveal the content of his resolution to anyone, beyond confirming that it is due in the 'first quarter'.

DA phone home

Mercury advertises lavishly on television, usually with ads featuring stylish yuppie types opening up new businesses in chic Dockland locations, and saying that they picked Mercury simply because they like doing business with 'people who think like them'. The added message of a cheaper service on Mercury is conveyed by saying that you pay a quarter less money for the same amount of call time.

Orson Fact reports that 'Sir Les' Atherton immediately signed up. Sir Les is not usually one to fall for this image-conscious rubbish – but he did it because he realised you can also get a third more call time for the same money.

Blunderbox

Apologies to CDS Software for suggesting in last month's Abuser that its fine presentation knapsack was less than capacious. The knapsack should have been described as 'smellier', not 'smaller'.

Curse of Abuser

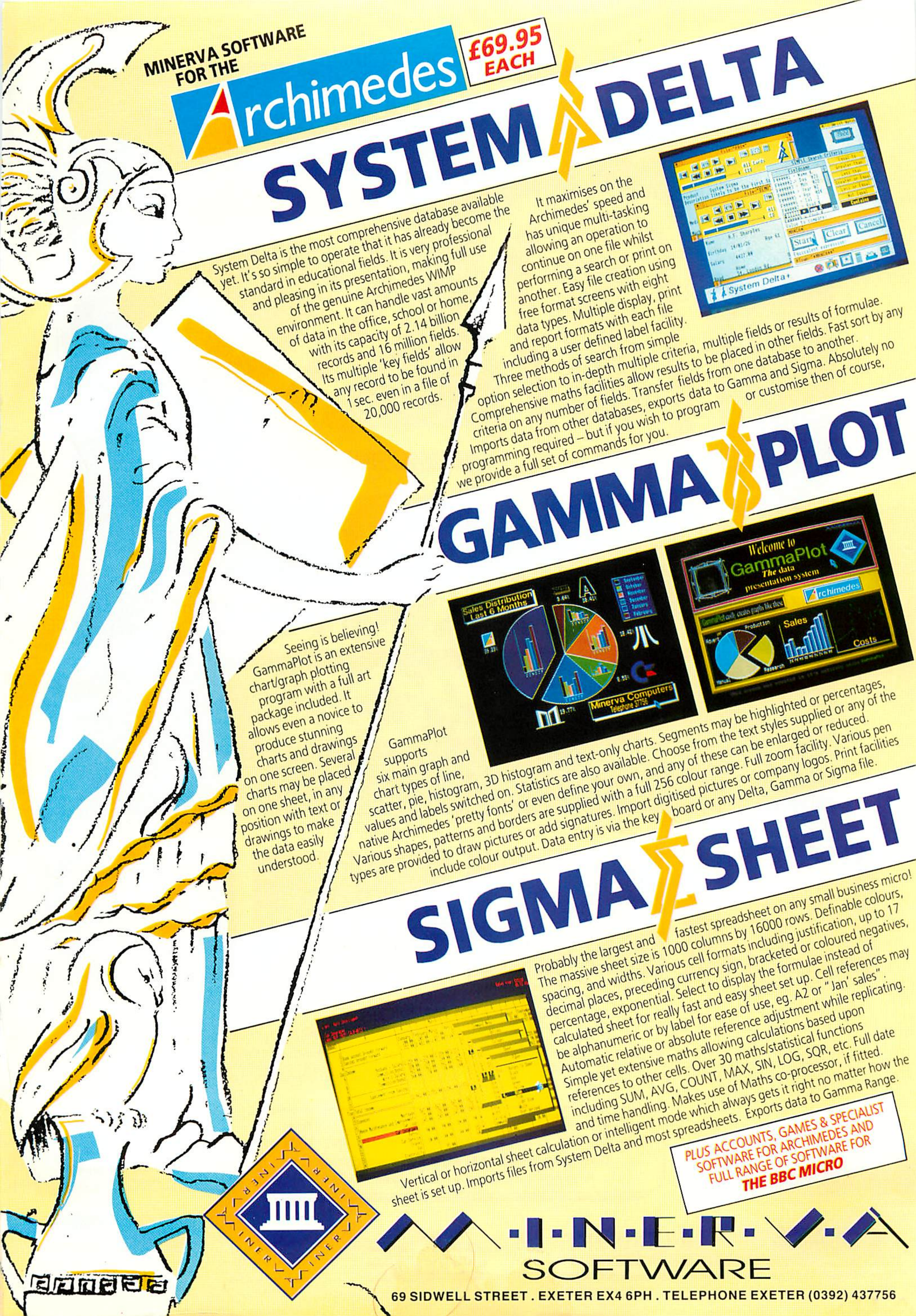
Agora supremo Dave 'My Little Pony' Action said, 'No problem, I'll write one', when Orson Fact pointed out there was no way of backing up really long files stored on an Arc hard disc. There's no backup utility yet, and you can't save a file longer than 800k on a floppy disc.

Dave set to work, but he'd reckoned without the legendary curse of the Redwood dungeon – the shade of Mad Alex – and next day was struck down by a crashed hard disc. He hadn't backed it up because there was no backup utility . . .

Learning curve

Pedestrians, particularly in Kent, should be careful.

The latest trendy thing to do among the staff at *BAU* is to learn to drive. Pavements have been crowded with motorists seeking to avoid oncoming Peugeot 205s driven by speed-crazed micro hacks.



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